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# AMERICAN JOURNAL OF OPHTHALMOLOGY

Volume 15

February, 1932

Number 2

## DYSTROPHY OF THE CORNEAL EPITHELIUM IN VERNAL CATARRH

M. N. BEIGELMAN, M.D.  
LOS ANGELES

A dystrophy of the corneal epithelium observed in two cases of vernal catarrh is described. In one of these cases a histopathologic examination was performed. An attempt is made to establish the place of this complication on one side among the degenerative lesions of the corneal epithelium and on the other side among the corneal dystrophies occurring in the course of vernal catarrh.

The early writers on vernal catarrh (Arlt<sup>1</sup>, Horner<sup>2</sup>) were of the opinion that in the course of this disease the cornea always remained intact. In fact, the absence of corneal involvement was considered, at that time, an important point in differentiating vernal catarrh from other hyperplastic diseases of the conjunctiva. Gradually, with the accumulation of a larger number of observations, this conception has somewhat changed, and in the first review on vernal catarrh (by Saemish,<sup>3</sup> in the second edition of Graefe-Saemish's *Handbuch für die gesamte Augenheilkunde*) the possibility of corneal lesions was definitely established. This was admitted with two reservations: that the corneal complications of vernal catarrh were exceedingly rare, and that they constituted a simple extension of the bulbar excrescences into the cornea. In the next general survey of the subject (Axenfeld's<sup>4</sup> report on vernal catarrh made before the French Ophthalmologic Society in 1907), the corneal complications of vernal catarrh were discussed in a more detailed way. Practically all hitherto described cases were mentioned, without, however, any conclusions as to their nature, significance and frequency in the course of the disease.

It remained for Trantas<sup>5</sup> to bring the corneal lesions of vernal catarrh into the foreground by presenting in 1910 an exhaustive and interesting study of this complication. Working in Constantinople where vernal catarrh is more prevalent than in any other part

of the world, Trantas became convinced that corneal involvement in vernal catarrh, contrary to the generally adopted conception, was exceedingly frequent. In most cases, according to Trantas, it was so minute as to be overlooked unless the cornea was routinely studied under oblique illumination, with a loupe and with fluorescein staining. In 31 out of 68 cases of vernal catarrh which he observed, corneal changes of widely varying appearance were found. Trantas attempted also to offer a new classification of these corneal lesions based on clinical and partly pathologic data.

With the advent of the slit-lamp era and with the new facilities for a detailed study of corneal changes, further progress in this problem was to be expected. It was not, however, until 1927 that the work of B. Alajmor<sup>6</sup> on biomicroscopy of the cornea in vernal catarrh appeared. His conclusions were in complete accord with Trantas' findings. The Italian author went even so far as to claim that with the slit-lamp corneal changes could be observed at one time or another in practically every case of vernal catarrh.

Whether the latter statement is just, or whether it represents the usual "swing of the pendulum in the opposite direction", remains to be seen. At the present stage of our knowledge, corneal involvement in vernal catarrh must be considered as a frequent complication, although in most instances it fortunately does not result in an impairment of the visual functions.

Of these corneal lesions, the better known group is characterized by direct continuation of the diseased process from the limbus into the corneal substance. The cornea may be covered by vegetations identical with those at the limbus (cases of Axenfeld and Ruprecht<sup>7</sup>, de Peyrelonge<sup>8</sup>, Seefelder and Berger<sup>9</sup>, Bistis<sup>10</sup> and others) or by a pannus-like gelatinous membrane (Millingen<sup>11</sup>, Fuchs<sup>12</sup>); it may appear affected in a way resembling sclerosing keratitis (Camuset<sup>13</sup>, Schobl<sup>14</sup>, Dimmer<sup>15</sup>, Wechsler<sup>16</sup>, Danvers<sup>17</sup>, Blaschek<sup>18</sup>, Roy<sup>19</sup>) or it may be narrowed in its horizontal meridian by an apparent advancement of the opaque limbal zone. The essential feature in all these cases is a spreading of the inflammatory infiltration by continuity from the bulbar conjunctiva into the cornea proper. This has been partly confirmed by the histopathologic studies of Axenfeld and Ruprecht<sup>7</sup>, Trantas<sup>8</sup>, Seefelder<sup>9</sup>, and others.

The situation is entirely different in the group of corneal lesions which complicate the course of vernal catarrh without any direct connection with the affected limbus. They sometimes occur in the palpebral form of vernal catarrh in which the hyperplastic changes are limited to the tarsal conjunctiva; or in the presence of limbal vegetations they are separated from them by a zone of healthy corneal tissue. The pathology of such corneal complications is hardly known. Attempts to classify them and to establish their correlation with vernal catarrh are also exceedingly scarce.

To this particular group of complications belongs a non-inflammatory affection of the corneal epithelium which I observed during the last two years. Although somewhat similar changes in the superficial layers of the cornea have been reported, detailed microscopic studies were not previously made. The histopathologic findings in one of my cases, together with information obtained through the use of the slit-lamp, have brought out a few points of possible interest for the understanding of these corneal changes.

**Case 1.** Mr. R. K., aged 29 years,

has had vernal catarrh of both eyes for nine years. Local applications of various kinds never brought him appreciable relief. Alaska was the only place in which the patient felt free from any disturbing symptoms, but his return to California was always followed by a recurrence of intense photophobia. In January, 1930, I noticed under oblique illumination some opaque points on the surface of the left cornea, and under the slit-lamp several circular opacities in the cornea were seen. They were limited to the epithelial layer, and had a slightly granular, lusterless appearance. Fluorescein staining was negative. In the course of time the opacities increased both in number and in size, however, at an extremely slow rate. At no time were the deeper lying layers of the cornea affected. Neither was there any involvement of the corneal nerves to be detected by the slit-lamp. As the changes were limited to the extra-pupillary part of the cornea, the visual acuity remained normal throughout the period of observation. No concurrent inflammatory signs and symptoms such as peri-corneal congestion, pain, and lacrimation were ever recorded in this case.

**Case 2.** On June 22, 1930, Mr. J. S., aged 19 years, consulted me in regard to an eye condition of six months duration. He complained of sensitiveness to light, itching in the eyes, and blurred vision particularly in the morning. Examination revealed typical vernal catarrh. The changes were limited to the tarsal conjunctiva which was covered by large and flat vegetations with deep furrows between them. There was the usual stringy mucous discharge. The bulbar conjunctiva was congested and somewhat thickened, particularly around the limbus. In the upper temporal quadrant of the right cornea a superficial opacity from 1 to 2 mm. in diameter was seen. It was separated from the limbus by a zone of clear corneal tissue, not less than 2 mm. in width. Under the slit-lamp the opaque area was localized in the epithelial layer. It consisted of two

very slightly depressed and somewhat rounded spots with a bridge of normally leveled and granular opaque substance between them. An epithelial bedewing of this part of the cornea was easily seen on transillumination. The endothelial mosaic in the zone of specular reflection was normal. No changes were found in the thickness and course of the corneal nerves. The sensibility of the cornea was normal except in the affected area, in which it was markedly reduced. The fluorescein test was negative.

In the following months there was a slight increase in the size of the lesion. It seemed to be spreading towards the pupillary area. On May 10 I removed, for the purpose of microscopic examination, a small particle of the cornea. After the first incision with a Graefe knife placed almost parallel to the corneal surface, I found that the superficial layer of the cornea was rather loosely connected with the underlying tissue. It was possible to peel off a piece about 3 by 4 mm. which partly included the clinically affected area. The specimen was fixed in formalin, imbedded in Altmann's mixture, and stained with Hematoxylin-Eosin, Van-Gieson, Thionin, and Polychromous Methylen-blue. In order to eliminate serious mechanical or chemical damage to the epithelial cells which might result in misleading histopathologic artifacts, the following precautions were taken: during the biopsy and in the subsequent laboratory manipulations the specimen was handled with utmost care; in transferring it a spatula was used instead of a forceps. In the process of dehydration, alcohols with an exceedingly slow increase of concentration were employed. The effects of the local anesthetic were also considered. Only 2 drops of a 4 percent cocaine solution were instilled previous to the biopsy. The findings of numerous authors (particularly those of Würdinger<sup>20</sup>) regarding the pathologic changes in the corneal epithelium following cocaine instillations, were taken into account. All this was done in the anticipation that the changes in the corneal

epithelium might be so insignificant as to justify doubts in their pathogenetic genuineness. The microscope, however, revealed the characteristic picture of an extensive degenerative process in all layers of the corneal epithelium. Under low magnification each section was found to consist of two parts which obviously represented two stages in the progress of the disease. One was impressed that the part of the specimen in which a comparatively milder degree of degeneration was seen (Fig. 1) belonged to the clinically "normal" cornea, while advanced changes (Figs. 2 and 3) in the other part corresponded to the clinically affected area. In a few places the final stage of the degenerative process was evident from the complete necrosis of epithelial cells, which were replaced by formless detritus; next to this were seen cells individually well outlined but deprived of the nucleus and with a granular appearance of the protoplasm. Various degrees of nuclear disintegration were seen in all layers of the corneal epithelium. In many cells the alteration appeared in the form of a perinuclear vacuolization or a marked swelling of the cytoplasm. Intercellular clefts were present in the basal layer, and only occasionally among the polygonal cells. Because of the change in the size of individual cells in connection with their swelling or shrinkage and because of the variation in the number of layers, the corneal epithelium appeared to be quite unequal in thickness.

When the corneal biopsy was performed, a piece of bulbar conjunctiva adjoining the limbus, was also removed. On microscopic examination the conjunctival epithelium appeared hypertrophied (Fig. 4). The subconjunctival tissue was moderately oedematous. The superficial blood-vessels, branches of the posterior conjunctival artery, were somewhat dilated. A mild diffuse round cell infiltration could be seen in the subepithelial tissue, partly associated with the dilated blood vessels.

The histopathologic changes in the corneal epithelium do not leave any

doubt as to their degenerative character. On the other hand, repeated slit-lamp observations have shown that the corneal involvement never transgressed the limits of the epithelial layer. This answers the question as to whether the alterations found in the epithelium could not be secondary to some other affection of the cornea proper, and definitely places the reported complica-

The classification of corneal dystrophies is, generally speaking, a matter of recent interest. Until the last few years, the study of corneal dystrophies emphasized the accumulation of clinical observations rather than the proper grouping of cases along some pathologic or etiologic principles. Too many "new" clinical entities were being created, sometimes on the basis of in-

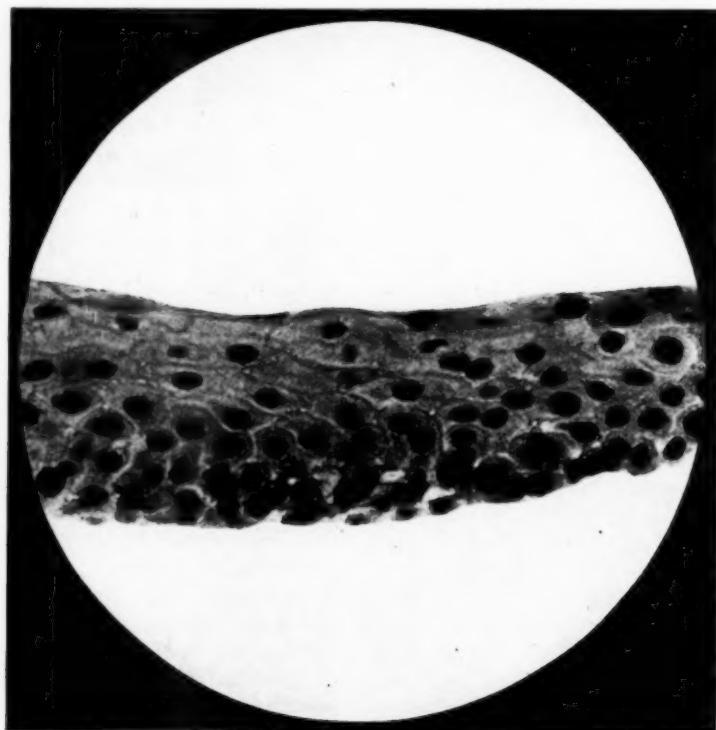


Fig. 1 (Beigelman). Epithelial changes in clinically "normal" areas.

tions in the group of "dystrophies of the corneal epithelium". The latter diagnosis of course was also suggested by the clinical characteristics of the lesion: the absence of inflammatory signs and symptoms, the exceedingly slow course, the noncyclic development of the disease.

We shall now attempt to establish the place of this corneal lesion, on one side, among the various types of epithelial dystrophies, and on the other side, among the non-inflammatory affections of the cornea as they occur in the course of vernal catarrh.

significant morphologic peculiarities. This almost chaotic state of things is gradually disappearing, as the interrelation between various corneal dystrophies becomes more evident.

In the present discussion, dystrophies of the cornea other than of the epithelial layer will be omitted. Mention must be made of those epithelial dystrophies in which no pathologic information has been obtained and which differ clinically from the type of dystrophy observed in vernal catarrh. Dystrophic changes of short duration in the corneal epithelium have been reported

as the result of exposure to Kleig-lights (Sédan<sup>21</sup>), to ultraviolet rays (Vogt<sup>22</sup>), to artificial alpine light (Thies<sup>23</sup>), to lightning (Igersheimer<sup>24</sup>, Vossius<sup>25</sup>, Silex<sup>26</sup> and others). Among workers in the sugar and silk industries a peculiar epithelial dystrophy is observed as an occupational disease. Closely related to these types of dystrophies, from the standpoint of the probable exogenous

(M. Bücklers<sup>23</sup>), has a very characteristic appearance, particularly when stained with fluorescein. Otherwise very little information is given regarding the nature and course of this lesion.

The report of Nelson M. Black and F. H. Haessler<sup>24</sup> on a dystrophic intracellular opacity of the corneal epithelium is of particular interest because it presents many features similar to



Fig. 2 (Beigelman). Advanced epithelial changes in clinically affected areas.

origin and the transient character, are the traumatic epithelial dystrophies described by Rolandi<sup>27</sup>, Bachstetz<sup>28</sup>, Caspar<sup>29</sup> and others.

A peculiar group of dystrophies was isolated by Stern<sup>30</sup>, Löhlein<sup>31</sup>, and Streiff<sup>32</sup>. The epithelial changes were so ephemeral that they would come and disappear within hours, sometimes within minutes while the patient was being examined with the aid of the slit-lamp.

The recently described "crescent-form" dystrophy of the corneal epithelium, judging from the illustrations

those observed in my cases. In the dull lusterless appearance of the opacity, in the changes of corneal sensibility, in the reaction to fluorescein, the condition as I observed it rather closely resembles the findings of Black and Haessler. Unfortunately no histopathologic examination could be made in the latter case, and the analogy remains necessarily within the limits of clinical data.

The only type of epithelial dystrophy which has been repeatedly and thoroughly studied by many investigators both from the clinical and from the

histopathologic viewpoint, is the so-called "recurrent erosion" of the cornea. The degenerative alterations in the nuclei and cytoplasm of the epithelial cells, as they are described by A. Szily<sup>35</sup> and others are identical with those found in our sections. There is, however, one notable difference: the intercellular vacuolization which is so prevalent in the pathologic picture of

the corneal epithelium simply a coincidental occurrence in the course of vernal catarrh, or is there a pathogenetic relation between the two conditions? The latter assumption is supported by a number of observations in which non-inflammatory affections of corneal surface were observed as a complication of vernal catarrh. Such are at least some of "troubles poussier-



Fig. 3 (Beigelman). Advanced epithelial changes in clinically affected areas.

the recurrent erosion and because of which Szily proposed for this lesion the name "epithelial disjunction", is hardly represented in the microscopic picture of the epithelial dystrophy in vernal catarrh. In fact the only evidences of cellular dissociation in our case are the few clefts in the basal layer of the corneal epithelium. In the absence of acute recurrent attacks and in the painless course, we find the important clinical points which differentiate the epithelial dystrophy of vernal catarrh from the "recurrent erosion" of the cornea.

Was this peculiar dystrophy of

"eux" described by Trantas<sup>5</sup>. E. Jackson's<sup>36</sup> case of a transient superficial haze of the cornea, without any inflammatory signs, probably belongs to the same group. In a very recent communication, Blanco<sup>37</sup> reported a degeneration of the corneal epithelium in the course of Saemish's conjunctivitis. It is true that, in the absence of slit-lamp and histopathologic findings, the exact localization and nature of these corneal lesions were not definitely established, but from the purely clinical standpoint they can be best interpreted as epithelial dystrophies. In addition, it is

worth while recalling that in the cornea proper, dystrophic alterations have been observed on numerous occasions. The frequent occurrence of a peripheral degeneration in the cornea, identical with a gerontoxon, was reported by many authors, from Blashek<sup>18</sup> and Knuss<sup>38</sup> to Gallemarts<sup>39</sup> and Jackson<sup>36</sup>. In fact it is claimed, that many years after the disappearance of the conjunc-

tive epithelium, Wood himself observed it in at least two cases.

The dystrophic alterations affecting the cornea proper, the keratoconus and the gerontoxon, are undoubtedly the result of a disturbed corneal metabolism. It was brought out long ago by E. Fuchs that the excessive limbal vegetations in vernal catarrh may at times interfere with the nutrition of the

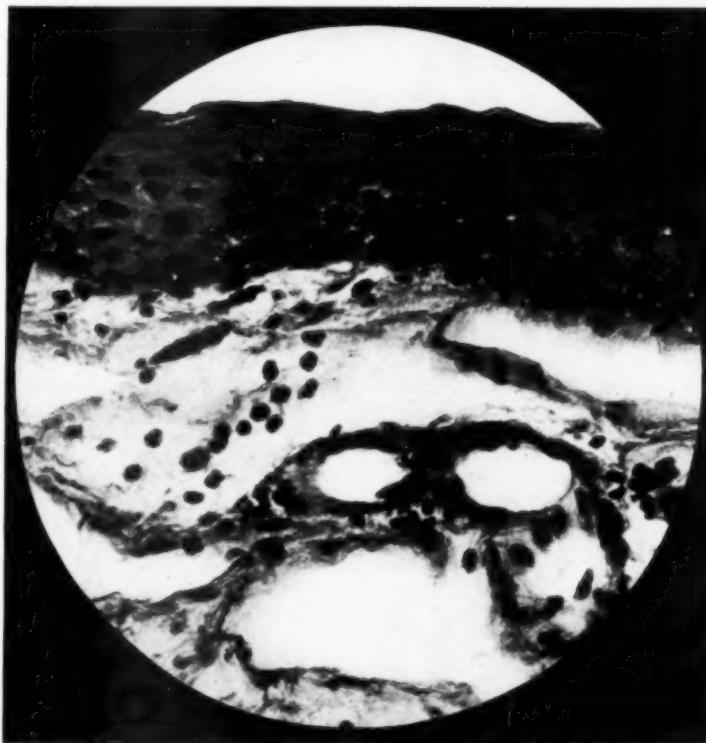


Fig. 4 (Beigelman). Changes in the conjunctiva near limbus.

tival lesion, the peripheral opacity in the cornea remains as the only evidence of a vernal catarrh history. Another type of corneal dystrophy complicating the course of vernal catarrh has come to light in recent years. In 1919 Gonzalez<sup>40</sup> reported a keratoconus of rapid development consecutive to "exuberant pericorneal conjunctivitis". A similar case was described by Rizzo<sup>41</sup> in 1925. In 1927 the work of Wood<sup>42</sup> appeared in which the association between vernal catarrh and conical cornea was assumed to be definitely es-

tablished. Wood himself observed it in at least two cases.

The dystrophic alterations affecting the cornea proper, the keratoconus and the gerontoxon, are undoubtedly the result of a disturbed corneal metabolism. It was brought out long ago by E. Fuchs that the excessive limbal vegetations in vernal catarrh may at times interfere with the nutrition of the

cornea and result in the formation of a gerontoxon. This explanation was suggested to him by the occurrence of similar peripheral opacities of the cornea in cases of limbal tumors. The same factor is considered (Gonzalez<sup>40</sup>, Wood<sup>42</sup>) responsible for the conical deformation of the cornea.

In contradistinction to the deeper seated corneal dystrophies, those of the epithelial and subepithelial layers are generally considered as neuropathic rather than metabolic in origin. (See Hanke's<sup>43</sup> review on Neurotrophic

and Degenerative Lesions of the Cornea). It seems, however, that no sharp line can be drawn in the pathogenesis of the two groups of dystrophies. Lesions of the corneal nerves, and possibly primary ones, are known to occur in some dystrophies of the cornea proper. On the other hand, there is hardly any reason to deny the possibility of an epithelial derangement as

the result of faulty corneal metabolism. In the light of modern views on the rôle of the constitutional factor in the origin of vernal catarrh, it is possible that both the superficial and deep dystrophies of the cornea in this disease will eventually be correlated with some systemic disorders.

1930 Wilshire boulevard.

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## THE BARRAQUER OPERATION FOR THE REMOVAL OF SENIILE CATARACT

As practiced by Professor Ignacio Barraquer

WILLIAM J. HARRISON, M.D.

PHILADELPHIA

The author, after spending some nine months under the personal instruction of Professor Barraquer in Barcelona, Spain, gives in a thesis which is on file in the library of the Jefferson Medical College, a detailed account of the routine employed in preparation and operation. The steps in the operation are carefully described and the reasons for each discussed. A statistical analysis of results obtained in 117 cases is given. The paper here presented is a summary of the thesis. Since the preparation and operation have been fully described by Dr. G. Oram Ring in the American Journal of Ophthalmology in February, 1929 (v. 12, No. 2, pp. 98-105), this part of the thesis is much condensed. The chief idea in publishing this paper is to present, at Dr. Barraquer's request, his reasons for the procedures in his operation. Dr. William J. Harrison was selected from the staff of the Jefferson College by Dr. C. E. G. Shannon, professor of ophthalmology in that institution, on the invitation of Dr. Ignacio Barraquer for some ophthalmologist on the staff of Jefferson College to spend a year in his clinic at Barcelona. The experience was made possible by utilizing funds from the Corinna Borden Keen Research Scholarship.

One definite physical force has stood in the way of the ultimate adoption of any of the cataract operations. This force, known as pressure, while removing the lens and the capsule, sometimes forces vitreous out of the eye.

The transmission of this force to the ciliary region produces irritation and inflammation of the inner structures of the eye. Any ciliary inflammation so produced has given us the dreaded resultant exudate which elected the pupillary area for its deposition. The equal transmission of a force in all directions was scientifically proven by Pascal, by means of a hollow sphere with multiple openings on the surface. This sphere was filled with water and by making pressure through one of these openings the water was forced out through all of the openings with equal force. It is apparent that the aim of all operators since the early seventeenth century has been the total elimination of the lens and capsule without producing inflammation or injury to the eye and its adnexa.

There have been many intelligent but unsuccessful attempts to accomplish this end. For instance, Kuhns thought that by cutting through the zonular fibers one could extract the lens and capsule complete. However, to be successful, it was necessary to work behind the iris and in a small posterior chamber, dangerously close to the

ciliary region. This method was abandoned. Vard Hulen in 1910, devised a suction pump but speedily discarded it as his loss of vitreous was too great. The Stoewers instrument was likewise discarded for the same reason. It remained for Prof. Ignacio Barraquer of Barcelona, who observed a leech raise a small stone by suction, to devise an electrical suction pump which utilized correctly the principle of suction. An operation with this suction pump was named phacoerisis by Professor Barraquer.

### Physical examination of the patient

A complete physical examination with blood pressure and urinalysis is made by an internist connected with the eye department. All possible foci of infection, such as teeth, tonsils, sinuses, gall bladder, etc., are investigated. A complete study of the eye is made with the ophthalmoscope and the slitlamp. The type of cataract is determined by the use of the slitlamp and it is classified according to its hardness, softness, evenness of grain and the presence or absence of vacuoles. The soft type is mushy and resembles boiled rice.

The degree of vacuum to be used depends on the type of cataract and varies from 53 in the softest types to 60 in the hardest types and is estimated in volumes of mercury and recorded by a manometer.

### Preliminary preparation of the patient

In preliminary preparation of the patient a test pad is placed over the eye to be operated on the night before the operation. If, on the following morning there is no secretion on the pad, the case is considered clean and ready for operative treatment. If the pad contains a hard secretion a smear is taken of it and examined by the microscope. Invariably, hard secretions are nonpathogenic. When the secretion is soft, it is thought to be pathogenic and the patient receives a preliminary treatment of two percent silver nitrate to the lids and caruncle. The lid-margins are given an application of bin-iodide of mercury ointment. This treatment is given again twelve hours later, and a test pad again applied. If the test is now negative, the operation is performed. The preliminary scrubbing of the field of operation is done before the injection for paresis of the lids. An injection of one to two percent solution of novocaine is placed along those branches of the facial nerve which will paralyze temporarily the action of the orbicularis, according to the method of van Lint.

The patient receives an ointment of five percent cocaine and five percent euphthalmine, into the conjunctival sac, seventy-five minutes before operation. This is repeated in twenty minutes. Usually, two applications are sufficient. A four percent solution of cocaine is dropped on the cornea before and during the operation.

### The operation

Professor Barraquer always operates seated at the head of the patient. To his left on a table are the instruments, and necessary surgical material, presided over by an assistant. The instruments are dry sterilized in a metal case and are removed and arranged on the table in the order of their use. Needles and sutures are contained in an alcohol tube, which is broken at the time of operation. Glass rods with the ends wrapped with gauze are used as mops. The box contains the following instruments: knife (Barraquer); iris

repositor; fixation forceps; tissue forceps; iris forceps (Hess-Barraquer); iris scissors (Barraquer); needle holder without stop (Barraquer); lid elevator (Desmarres); and several corneal needles threaded with black silk.

Another table to the right of the operator holds the suction pump on a lower shelf, and the erisiphake on the upper shelf.

The eyelids are separated by means of the Desmarres elevator for the upper lid, and the thumb of the right hand of the assistant for the lower lid. Between the different steps of the operation the lids are allowed to close partially, when directed by the operator. Responsibility of the eyelids is this assistant's sole duty.

The fixation of the eye is made by grasping the conjunctiva near the limbus at six o'clock. The incision is made to embrace two-fifths of the circumference of the cornea at one millimeter from the limbus so as to get a narrow fringe of conjunctiva. After the exit of the point of the knife, the handle is depressed and the first third of the section made. The handle is now raised to complete the second third of the section, and by bringing the knife straight up, the final third, which includes a conjunctival flap, is made. The flap is partially turned back and a small peripheral iridectomy is performed superiorly. Care is taken not to remove the pinched-up iris from the anterior chamber during this step of the operation. A conjunctival suture is placed at "twelve o'clock." A loop is made, but not drawn tight. This loop is laid over on the nasal side of the globe if the operation is on the right eye, on the temporal side of the globe when the operation is on the left eye. The under limb of the thread is pulled out of the way. Any excess of fluid or blood is carefully wiped away with the gauze mop. Blood clots are removed from the section by a pair of small forceps.

The erisiphake is introduced into the anterior chamber from the temporal side of the section if the operation is on the right eye, and on the nasal side of the section if the left eye is operated

on, and placed in position on the center of the lens without producing any pressure. Then the thumb valve is pressed, producing rarefaction of air or vacuum, this vacuum of air being thereby transmitted to the anterior capsule of the lens, molding the capsule and as much cortex as the cup will hold. The rupture of the zonule is accomplished by the vibrations of the pump.

If the vacuum has been exact, the vibrations rupture the zonular fiber at one millimeter from the lens. The lens is dislocated from its patellar fossa by gently rotating the lens on its transverse axis. This is the so-called tumbling method. In some cases the lens is not tumbled but is removed in the upright position after dislocation from the patellar fossa. The conjunctival suture is now tied by means of two pairs of small forceps, and the toilet of the wound partially made. As a rule about four or five additional sutures are now placed in the wound to close it completely. With an iris repositor the toilet of the wound is now completed. If the lid paralysis has been excessive, a lid suture is introduced. Eserine, in the form of one-half percent ointment is placed in the lower cul-de-sac. Mercury bichloride ointment, one to three thousand, is then spread over the lid-margins. An oval piece of moistened gauze is placed over the closed lids. Pieces of absorbent cotton are now built up to the level of the eyebrow to form an oval pad. The good eye is likewise dressed.

A cardboard mask is now placed over both eyes and secured to the face by one-half inch wide strips of adhesive plaster, which follow the edges of the mask.

The patient is then lifted to a wheel chair and placed in bed.

The first visit is made to the patient 24 hours later. If the patient is comfortable, does not complain of pain, and the mask is not soiled, no further attention is given that day. The temperature, pulse rate, and urinary output are recorded daily. While daily visits are made, the eyes are not uncovered until the fourth day. If the pupil is round, black, central, and large, nothing is

done. If the pupil is small, a one percent solution of atropine is instilled. A moistened piece of gauze is used to wipe away any incrustation or secretion along the lid margins, no wash being used.

The eye is dressed again on the sixth day and if normal in appearance, the patient is permitted the use of the good eye. This examination is made in the clinic, to which the patient usually walks, a distance of 300 feet from the ward.

On the eighth day the sutures are removed and a light piece of gauze draped over the operated eye.

If no complications arise, the patient is usually discharged on the fourteenth day.

A preliminary refraction is made at the time of the discharge.

Final refraction is performed and glasses given about the fifth week.

#### **The reasons for various steps of the Barraquer operation, including preliminary preparation**

The physical examination of the patient is considered important as it rules out many cases that ordinarily come to the operating table and result in failure. Diabetic patients were not given insulin as Professor Barraquer has had several cases of choroidal hemorrhage in insulin treated patients. These patients are put on a strict diet and must be sugar free at the time of the operation.

Trachoma was not considered a contra-indication for the operation, providing that no active purulent discharge was present. Any discharge from the punctum was treated and if it was purulent in character the lacrimal sac was excised. Impermeability of the lacrimal canal did not interfere with the operation.

A complete study of the eye was made which included tension reading by the McLean tonometer; measuring the depth of the anterior chamber by the corneal microscope; testing the reaction of the pupil, and the recognition of projection and perception of light; noting the condition of the cornea; and

making an estimation of the phosphorus reaction.

The test pad and smear proved in a practical way the importance of determining the presence or absence of pathogenic organisms before operating. No infection occurred in our series of cases. The temporary paralysis of the orbicularis was sufficient in all but a few cases. No untoward effects occurred.

The euphthalmine and cocaine ointment provided an adequate dilatation of the pupil. Atropine may give excessive dilatation and thereby interfere with the performance of the peripheral iridectomy.

The constant and persistent pressure of the speculum produces orbicular contraction against the eyeball and predisposes to loss of vitreous. This causes the operator to be at the mercy of the patient. The eyelids can be controlled better by means of the Desmarres elevator for the upper lid, and the thumb of the assistant for the lower lid. If the patient squeezes, the lids can be immediately released, and no pressure is made on the eyeball. Oftentimes the removal of the speculum, the fraction of a second too late, means the loss of vitreous. Furthermore, between steps of the operation the lids can be released and allowed to close partially, thus giving intervals of comfort and rest to the patient.

The incision is approximately fifteen and one-half percent greater than the classical incision of today.\* This larger incision is not so apt to rupture the capsule as there is less liability of the capsule coming into contact with the sharply cut scleral edge. The conjunctival flap heals more quickly and therefore the complication from delayed union and incarceration of iris are less prone to occur. The danger of vitreous loss is diminished because of the greater containing capacity of the eyeball.

The conjunctival flap aids healing because the blood vessels of the conjunctiva supply the nourishment. The suturing gives better coaptation of the

wound edges. The corneal incision as sometimes used depends entirely on its lymph supply for nourishment and is, therefore, more exposed to infection. The only disadvantage of the conjunctival flap is the relatively rare large amount of hemorrhage which sometimes occurs and delays the insertion of the cup. The iris however is more liable to ride up on the knife edge and as a result involuntary iridectomies are more frequent than in the classical section.

The sliding violin-bow movement of the knife gives less tension with distortion of the globe. The introduction of the first conjunctival suture is a good measure. In seven cases loss of vitreous was prevented by the quick tying of the suture. Contrary to the belief that sutures predispose to infection, no such complications occurred. The ingrowth of epithelium in scleral sutures, as well as in the corneal sutures, has been reported. We had no such experiences and rather believe that the incarceration of the conjunctiva in the wound more aptly accounts for this accident. Conjunctival sutures can be made tight enough to wrinkle the cornea. There does not seem to be a single objection to the use of conjunctival sutures. The tying of the sutures by the forceps instead of by the fingers, is an added precaution against infection. The conjunctival sac is kept as dry as possible by the use of gauze mops. This tends to eliminate any possible entrance of infectious material through the wound.

The lens must be rotated on its transverse axis because the floor of the patellar fossa is in intimate contact with the posterior surface of the lens, and it is necessary to break this almost complete vacuum, otherwise the vitreous, by cohesion, will follow the lens when suction is applied. In the so-called tumbling method the pyramid of vitreous is less likely to be compressed between the lens and the sharp scleral edge. This seems to be safer than the upright delivery, as there is less likelihood of the capsule and of the hyaloid membrane being ruptured.

The conjunctival suture will prevent

\* The geometric calculation can be found in the original thesis.

the under-riding of the flap by the margin of the upper lid. When this accident occurs it usually means the loss of the eye. The eversion of the corneal flap due to pressure behind is prevented by the use of sutures. There is an almost immediate closure of the wound after the conjunctival suturing, favoring the early formation of the anterior chamber. In three of our cases, after the operation, the patients were seized with vomiting or coughing, but no loss of vitreous resulted. It is evident that in an eye, without conjunctival sutures, loss of vitreous is dangerously imminent, in the event of vomiting or coughing. In excessive paralysis of the lids, the placing of a lid suture adds to the safety of the operation.

The iridectomy is always performed prior to the cataract extraction. The impracticability of picking up the iris after the lens has been removed renders this a definite disadvantage.

The small nearly peripheral iridectomy has many definite features to commend it as evidenced by the perfectly round, black, pupil, which is central, with full contracting and dilating functions, readily adapting itself to variations in light intensities. The small opening is ample for its rôle, the prevention of iris prolapse and loss of vitreous. The uncomfortable dazzling and aberration of light does not occur.

The classical keyhole iridectomy presents no such advantages, and furthermore, gives a disfiguring functionless iris with probable adhesions of its pillars to the surrounding structures.

The fixation of the globe, as near to the limbus as possible is practical as there is less tearing of the conjunctiva. The site of fixation does not produce any pressure on the globe at the time of the knife puncture as usually experienced when the fixation is applied at the nasal limbus.

A circular rubbing over the wound with the extracted lens held by the cup reduces the possibility of the incarceration of the iris and helps to mold back into place a threatened hernia of the vitreous.

Clots of blood are removed by a delicate pair of forceps. Gauze mops are

used instead of absorbent cotton to prevent the possible incarceration of fibers of cotton in the wound. The placing of the eserine ointment in the conjunctival sac is to avoid the entering of superior fibers of the zonule into the wound, which may produce incarceration. Ointments are used instead of solutions because of their nondrying effect and full therapeutic action.

The same suction pump has been in use at the clinic for the past three years and at no time has it refused to perform. It is tested always by holding the erisiphake close to the operator's ear and listening for the in-rush of the air when the thumb valve is pressed. The required pressure is also checked by the operator's assistant, at the same time. There is no pressure exerted on the lens by the cup. There is no pressure on the globe by the forceps at any stage of the operation.

The bichloride of mercury ointment on the lid margin is to inhibit the growth of bacteria from the roots of the cilia.

The cardboard eyepad has proven effective against the mishaps that occur in a nonprotected eye. Bandaging is not resorted to as it exerts unequal pressure whenever the head is moved on the pillow. The extraction of a Morgagnian cataract by the suction method is easily accomplished. In soft eyes it is quite difficult to grasp the capsule as the lens tends to slip backward and, by rupturing the delicate hyaloid membrane, to become dislocated into the vitreous chamber. Again, the suction method proves an admirable way of removing a lens of this type. The extraction of a juvenile lens in its capsule was successfully performed in seven cases. However, the juvenile and the senile dislocated lens, are types for which the suction method is not advised.

#### Loss of vitreous

While in many of the cases of loss of vitreous there is a definite ultimate reduction of vision, it is not because of the loss of bulk of the vitreous, but the alteration resulting from the readjust-

ment and the refilling of the space probably by aqueous humor. The framework of the vitreous is never replaced. Contracting fibrillary bands supplant the normal reticulum producing retinal detachments with accompanying minus tension. The recti muscles, by their action on the globe, give the square globe so characteristic of atrophy. A fluid vitreous as seen in degenerated globes, due to myopia, is another definite cause for vitreous loss. The invasion of the vitreous by cellular elements producing vitreous opacities when the posterior capsule is removed, has not been noted in Professor Barraquer's experience, and he believes that the hyaloid must have been ruptured in most such cases. He states that in those cases which show vitreous opacities where the hyaloid has not been ruptured, the cause must be considered as due to senility and will not result in any visual loss. The stretching of the zonular fibers in the capsulotomy operation accounts for the incidence of postoperative iritis. This is avoided in the suction method. Faulty technique will also cause bruising of the iris, resulting in iritis. Hernia of the vitreous is less common than in the forceps expression as the use of the eserine and the conjunctival sutures, maintain the closure of the wound and do not permit the loss of the aqueous which is the underlying causal factor.

The average operation consumes twenty-five minutes.

Striated keratitis occurred in several cases and was due to the rubbing of the lens against the posterior layer of the cornea. Examination after the fourth day with the slitlamp usually showed its absence.

There is less astigmatism in the cases operated on by the suction method.

No cases occurred where the iris was caught by the cup during the extraction. Neither was the vitreous drawn into the cup at any time. When the rupture of the capsule occurred during the rotation of the lens, it was due to a vacuum of too great intensity, and the capsule was usually removed by small tissue forceps.

### Conclusions

The sum of all these intimate details of the Barraquer suction operation is a definite aid to the successful removal of the cataract, with the additional advantages of shortened convalescence, total absence of potential inflammatory lens and capsule remains, and good visual acuity.

As pressure on the globe is mainly responsible for most vitreous losses, it is apparent that the use of the suction method, where no pressure of any kind is used, is a modern and scientific advancement.

### Analysis of cases

Type	Number of Cases
Senile .....	110
Juvenile .....	7
Total .....	117

AGES		
Age	Number of Cases	Approximate %
10-19 years .....	1	1
20-29 years .....	2	2
30-39 years .....	4	3
40-49 years .....	3	3
50-59 years .....	26	21
60-69 years .....	49	43
70-79 years .....	29	24
80-89 years .....	2	2
90-99 years .....	1	1
Total .....	117	100

### Extraction

Number Tumbled	Approximate %
89	76
Number not Tumbled	Approximate %
28	24

### Statistics on senile cataracts

The following percentages are based on 110 cases of Senile Cataracts:

Type	Number of Cases	Approximate %
Immature .....	14	13
Mature .....	89	80
Hypermature .....	3	3
Morgagnian .....	4	4
Total .....	110	10

### Statistics on complications

Number of Cases	Approximate %
52	42

The following percentages are based on the 53 cases which presented complications:

Complication	Number of Cases	Approximate %
Myopia	12	25
Vitreous opacities	8	17
Leucoma	13	27
Total	33	69

The remaining 31 percent were represented by the following 20 cases:

Complication	Number of Cases
Posterior Cortical	2
Diabetes	3
Detached retina	5
Glucoma	1
Seclusion of pupil	2
Pathologic iris	1
Optic neuritis	2
Lues	1
Lues (questionable)	1
Choroditis	1
Scotoma (temporal)	1
Total	20

#### In the above complications:

One myopic patient showed a floating body in the vitreous with asteroid hyalitis.

One myopic patient was huetic and showed seclusion of the pupil.

One myopic patient had a detached retina with leucoma adherens.

One myopic patient presented vitreous opacities and a questionable detachment of the retina.

One myopic patient showed vitreous opacities.

One myopic patient had associated old choroditis.

Two diabetic patients presented vitreous opacities.

The following statistics are based on the total number of cases:

Condition	Number of Cases	Approximate %
Sluggish pupillary reaction	10	9
Remains of capsule	1	1
Leaking anterior chamber	1	1
Treatment of lids by silver nitrate	3	3
Leucoma	13	11
Impermeable sac	11	10
Loss of vitreous	3	3
HypHEMA	5	5
Iritis	4	3
Tying of suture to prevent loss of vitreous	7	6
Suturing of lids	16	14

Involuntary iridectomy	11	10
Ruptured capsule	9	8
Hernia of iris	3	3
Hypopyon	1	1
Incarceration of iris	1	1
Hemorrhage from choroid with subsequent enucleation	1	1

#### Visual results

Number of Cases	Results
49	20/20 or 1.
19	20/22 or .9
12	20/25 or .8
3	20/35 or .6
6	20/40 or .5
6	20/50 or .4
3	20/65 or .3
6	20/100 or .2
4	20/200 or .1
7	Hand movements
1	Light perception
1	Choroidal hemorrhage
117	

Vitreous was lost in three cases as follows:

No. 1: Aged 18 years. Vision: Objects at four meters.

A myopic patient with leucoma adherens.

No. 23: Aged 56 years. Vision: 20/100 or .2

A myopic patient with detached retina and eccentric pupil.

No. 84: Aged 69 years. Vision: 20/100 or .2

The probable cause of vitreous loss was some fault in the technique.

Iritis was noted in four cases as follows:

No. 31: Aged 58 years. Vision: 20/20 or 1.

No. 32: Aged 58 years. Vision: 20/22 or .9

No. 112: Aged 78 years. Vision: 20/20 or 1.

No. 113: Aged 78 years. Vision: 20/20 or 1.

Hyphema occurred in five cases, as follows:

No. 15: Aged 52 years. Vision: 20/22 or .9

No. 63: Aged 64 years. Vision: 20/20 or 1.

No. 92: Aged 70 years. Vision: 20/40 or .5

Hyphema on 10th day. This case suffered loss of vitreous.

No. 104: Aged 74 years. Vision: 20/20 or 1.

No. 45: Aged 60 years. Vision: 20/50 or .4

Slit lamp showed numerous vitreous opacities.

Hernia of iris was seen in three cases as follows:

No. 54: Aged 62 years. Vision: 20/65 or .3

Vitreous opacities were also present.

No. 38: Aged 60 years. Vision: 20/20 or 1.  
A large iridectomy was performed on this patient on fourth day.  
No. 42: Aged 60 years. Vision: 20/20 or 1.  
A large iridectomy was performed on this patient on fourth day.

Leaking anterior chamber occurred in one case, as follows:

No. 50: Aged 61 years. Vision: 20/22 or .9  
On the fourth day some leaking from the site of the flap was noted and the cautery was applied. The chamber was completely formed the next day.

Detached retina was a complication in five cases, as follows :

No. 1: Aged 18 years. Vision: Objects at four meters  
Myopic patient with leucoma adherens.  
No. 46: Aged 60 years. Vision: Hand movements at three meters.

Immature senile cataract with divergent squint.

No. 115: Aged 84 years. Vision: 20/100 or .2  
Myopic patient.  
No. 2: Aged 22 years. Vision: Light perception.

A myopic patient—with complete detachment of retina and a traumatic cataract, due to blow on eye some months previously.

No. 37: Aged 60 years. Vision: Hand movements at two meters.  
With immature posterior polar cataract and vitreous opacities.

Seclusion of pupil was noted in two cases as follows:

No. 103: Aged 74 years. Vision: 20/100 or .2  
The capsule ruptured and lens was removed with Snellen loop. The adhesions were broken up.  
No. 19: Aged 54 years. Vision: Hand movements at four meters.  
A myopic and luetic patient.

303 South Seventeenth street.

## OCULOGLANDULAR TULAREMIA

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A brief review of the literature of tularemia is given, including history of the disease and a discussion of the diagnostic findings clinically and by agglutination tests. The case reported has been carefully investigated and photomicrographs of biopsy material and conjunctival smears are presented. The drawing of bacteria from a smear is the first on record from a human source.

Tularemia can be called the first American disease. Our knowledge of it has been entirely developed by workers in the United States Public Health Service. McCoy and Chapin, concerned with the study of rats and ground squirrels for evidence of bubonic plague following the California earthquake in 1906, discovered a new bacterium which caused a plague-like disease in rodents. This disease is characterized by the formation of tiny necrotic areas in the internal organs and lymph glands. Six years later they reported their discovery, naming the organism *Bacterium tularensis*, after Tulare County, where their discovery was made. The same year Chapin had a fever lasting about twenty-eight days, accompanied by gland enlargement. A positive agglutination test was obtained with bacteria isolated from the ground squirrel. This is the first record of identification of the disease in man as the result of serological studies.<sup>1</sup>

The same year, 1912, Wherry, Lamb, and Vail<sup>2</sup> described the first recognized case of oculoglandular infection of man with *Bacterium tularensis*. The case was primarily diagnosed as Parinaud's disease, then as glanders. It was the persistent work of Wherry that placed the case in the present classification.

Edward Francis, 1919-21, investigating deer-fly fever in Utah. Painstaking work enabled him to determine the *Bacterium tularensis* as the causative agent. He gave this newly discovered disease the name tularemia.

These early workers deserve praise for their perseverance. They almost all acquired the disease in the typhoid form. The story of their work is very fascinating<sup>1, 3</sup>. Today, laboratory workers dread contact with the disease and

warn others against culturing and animal experimentation; these are really unnecessary because diagnosis can be confirmed by the agglutination test.

The disease is carried by various insects and wild animals. Domesticated animals, when inoculated, succumb within a week. Man acquires it from bites by insects, wood-ticks, deer-flies, rabbit and rat lice, or by the handling of infected animals such as rabbits, squirrels, opossums, and others. The *Bacterium tularensis* is a small Gram negative organism, appearing in bacillary, coccidial, and bipolar forms. Four varieties of the disease are recognized: ulceroglandular, glandular, typhoid, oculoglandular. This disease has been recognized by the layman for years as rabbit disease, meat handlers becoming affected after handling rabbits in market. These men recognized the fact, too, that one attack immunized them. The serum agglutinins remain permanent. Positive agglutination tests have been made with *Bacterium tularensis*, where the patient had rabbit disease nineteen years previously<sup>4</sup>.

When Parinaud first reported his form of conjunctivitis, he ascribed the disease to a contagion derived from animals. Vail<sup>5</sup> and Wherry<sup>6</sup> are of the opinion that Parinaud's disease, conjunctivitis infectiosa necroticans<sup>7</sup>, and conjunctivitis tularensis are identical diseases. Arne Bryne<sup>8</sup> of Norway is of the same opinion. He is the first to report a case of oculoglandular tularemia in his country. Ohara, in Japan, described this disease independently from our workers. More recently Russian physicians have found many cases among fur handlers. These workers too have had a high percentage of infection.

Differential diagnosis between tuberculosis of the conjunctiva and tular-

emia can be easily made by animal experimentation. Animals die within a week after infection with *Bacterium tularensis*, while it takes weeks for tuberculosis to claim the animal. In view of the similarity of the clinical picture of tularemia and Parinaud's disease, it seems advisable to do an agglutination test in every case of doubtful Parinaud's disease.

Vail, Jr.<sup>9</sup>, summarized the important features of thirty-five undoubted cases of oculoglandular tularemia. His description is vivid—history of infection, sudden onset with almost simultaneous swelling of lids and neighboring glands, with deeply situated papules in the conjunctiva which resolve into ulcers. During the second week the positive agglutination test confirms the diagnosis. The case reported coincides with Dr. Vail's description.

#### Report of case

Mrs. E. G., 32 years of age, was first seen by her physician on November 19, 1930, at which time she complained of a sore left eye, sore throat, and painful swelling of the left submaxillary, preauricular, and cervical glands, general malaise, chills and fever. The lids were swollen, there was a stringy discharge from the eye, and four or five papules were present on the lower palpebral conjunctiva. On November 24 the physician asked me to see her. The lids were swollen, and a stringy discharge bathed the lashes. On the lower palpebral conjunctiva were eight punched-out soft ulcers, averaging  $1\frac{1}{2}$  by 3 mm. Between these, deep beneath the bluish conjunctiva, were three or four yellowish nodules, about 2 mm. in diameter. One yellow nodule was devoid of surface epithelium. A smear was made of this.

The history of the present illness given by the patient was as follows: November 14, while cleaning a rabbit, bloody fluid spurted into her left eye. She wiped the eye with a towel and continued her work. The next morning there was a sensation of foreign body in the eye. November 16, on waking, the left lower lid was swollen and the lids were stuck together. There was

no pain, merely annoyance from the swelling. There was one "white spot" in the center of the conjunctiva of the lower lid. Late that night she suddenly became ill, had chills, headache, and pain in the left side of the face and neck. The left submaxillary gland was swollen and tender. November 17, the swelling was worse, and the preauricular and cervical glands became enlarged and tender. More spots formed in the conjunctiva and the discharge became more profuse. On November 19 her temperature was 101 degrees, and this remained the maximum daily temperature for two weeks, after which it gradually returned to normal. The bulbar conjunctiva was at no time affected.

An agglutination test made at the Illinois Research Hospital in Dr. Arnold's laboratory on the tenth day was negative, but positive in 1 to 320 dilution on the seventeenth day.

On November 27, glands on the right side of the head became enlarged and painful, but for a few days only. New papules formed near the caruncle. During the entire course of the disease, fifteen papules, or nodules, became fifteen ulcers and healed with soft scars. December 1, five erythematous plaques\*, symmetrically placed, appeared about each knee. These disappeared in the course of two weeks<sup>10</sup>. December 6, severe itching of the skin developed, which lasted about nine days. Large welts would appear where the skin was rubbed. Black and blue areas occurred in the extremities on slight pressure. On January 26 the left submaxillary gland again became tender and larger than it had been at any previous time. After increased doses of arsenic and calcium gluconate, it decreased in size and is now, February 20, the size of a walnut. The patient has gained in weight and strength.

On December 3, the patient kindly consented to a biopsy from the con-

\* Netherton examined histologically a similar plaque from the arm. He found an infiltration by lymphocytes, endothelial cells and fibroblasts. This was mainly about blood vessels which were dilated and showed swelling of their endothelial lining.

junctiva. A piece of tissue,  $1\frac{1}{2}$  by 3 mm, was removed. A yellow nodule  $2 \times 2$  mm. presented itself, and this, too, was taken. There were no untoward symptoms due to this procedure.

**Smear:** a yellow nodule which was just ready to discharge, devoid of sur-

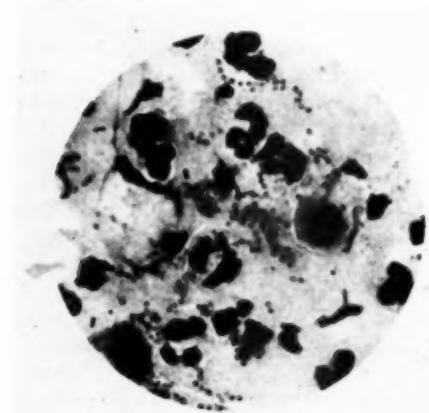


Fig. 1 (Theobald). Smear of necrotic nodule. (x800)

face epithelium, was teased and smeared as thinly as possible over a slide. This was stained with methylene blue. There was a great deal of stringy material between which were cells found in granulation tissue—lymphocytes, plasma cells, epithelioid cells, phagocytes. In one section of the slide were found many organisms. They were chiefly coccoid forms, extracellular, less than 1 micron in diameter. They were arranged in varying sized groups with a tendency to chain formation. Chains containing 8 and 10 bacteria were found. In places they appeared like diplococci. Their edges were furry, not showing the sharp contour of ordinary pus organisms. They stained poorly, but with varying degrees of intensity.

The nodule with its surface epithelium was 2 by 2 mm. Histologically it had much the same appearance as a trachoma granule or a tubercle, with its outer darker staining zone of round cells and its pale staining center. The surface epithelium was thickened, and

polymorphonuclear leucocytes were found between the cells in all layers. The center of the nodule contained epithelioid cells, lymphocytes, and plasma cells. A dense mass of lymphocytes surrounded this subacute infective granuloma. The vessels showed marked endothelial hyperplasia. No definite giant cell formation was found. The extra-nodular tissue removed,  $1\frac{1}{2}$  by 3 mm. was rich in plasma cells, epithelioid cells and mast cells. Some of the plasma cells contained two and three nuclei. Very few leucocytes were in the tissue. Sections were stained with methylene blue, Pappenheim's and Giemsa's stain. Search for bacteria in the tissue was not satisfactory.

In 1915, Sattler<sup>11</sup> removed a distinct caseated node from the ocular conjunctiva late in the course of a case of



Fig. 2 (Theobald). Nodule from palpebral conjunctiva 14 days after infection. (x45)

tularemia, and found that microscopically it appeared to be a "granuloma without giant cells, apparently occurring in a lymph gland". These histologic findings are similar to those of various workers in tissues elsewhere.

It is a chronic inflammatory reaction not unlike tuberculosis. There is a pro-

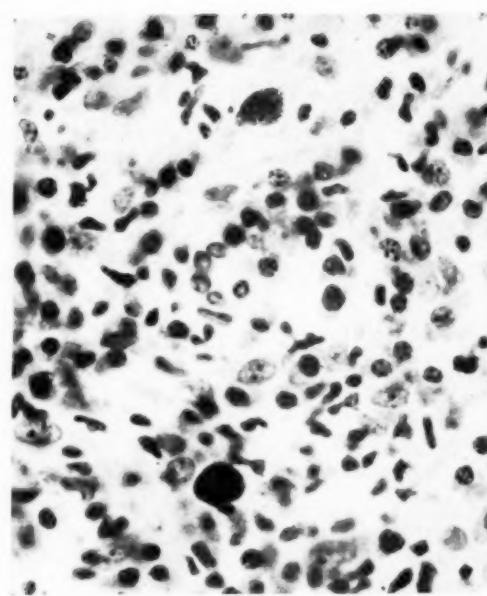


Fig. 3 (Theobald). Extra nodule tissue. (x375)

liferation of epithelioid cells, and a rich infiltration of mononuclear cells—lymphocytes, endothelial cells, and plasma cells. Occasional giant cells are found. There is no evidence of an acute purulent inflammatory process.

Since submitting the paper for pub-



Fig. 4 (Theobald). Gram negative bacteria. The very black ones are positive. Figures 4 and 5 can be matched.

lication, Dr. Edward Francis has kindly examined the tissue and smear. Dr. R. D. Lillie restained the smear by Gram's method. Both Gram negative and Gram positive organisms were found.

Dr. Francis<sup>12</sup> writes: "The field photographed was easily found and the Gram negative organisms photographed were plainly seen. Whether the Gram negative organisms are *Bacterium tularensis* is exceedingly diffi-



Fig. 5 (Theobald). Gram positive (black) photographed to obliterate the Gram negative.

cult to decide. What you have are cocci, some stained Gram positive and others Gram negative in a pyogenic process in a case of tularemia with no difference in morphology between the two organisms. About as good an argument could be put up on one side of the question as on the other."

Dr. Lillie<sup>13</sup> writes: "The specimen is very interesting to me on account of the pronounced lymphoid cell reaction and the polymorphonuclear participation, both of which are unusual in other tularemic lesions, and suggest to my mind secondary pyogenic infection, a suggestion which is further borne out by the presence of the Gram positive cocci in the smears."

Dr. Lillie searched the tissue sections for bacteria, but none could be identified.

To me the study of the tissue presents not the picture of a pyogenic process but of an infectious granuloma. Infiltration by lymphocytes with a sprinkling of polymorphonuclear leucocytes, with proliferation of epithelioid cells, and so forth, is the reaction of the

eye and lids to nonpyogenic infections, as evidenced by the histopathology of trachoma, tuberculosis, sympathetic ophthalmia, and other diseases.

I wish to express my gratitude to Dr. Edward Frances and Dr. R. D. Lillie, for their interest in this material, and to Dr. A. E. Biskup for the opportunity of studying the case.

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## A PROCEDURE FOR THE EXTRACTION OF CONGENITAL, SOFT, AND MEMBRANOUS CATARACTS

OTTO BARKAN, M.D.  
SAN FRANCISCO

A résumé of the history of cataract extraction and discussion is given with a description of present day methods of operating on membranous and soft cataracts. The disadvantages and complications of these methods are pointed out. The author recommends production of hypotony and maximal dilatation of pupil by use of adrenalin, 1 to 1000, subconjunctivally, and an oblique valve-like incision 2mm. within the cornea through which lens and capsule may be removed. Five cases are reported in detail in which excellent results were obtained by this procedure. Read before the Pacific Coast Society of Ophthalmology and Otolaryngology, May, 1931.

It seems well to trace the origin of present methods before describing a new procedure.

The first operation for cataract, depression with a needle, dates from ancient times. The needle that depressed the hard cataract of an adult pierced the capsule of a soft cataract which then disappeared by intraocular resorption. Hence as Beard<sup>1</sup> puts it, needling or acupuncture became the logical treatment for these soft cataracts that were not suitable for depression. Ambroise Paré gave new life to the operation, calling it "scleroticopuncture", for the route was through the sclera until 1797, when Conradi<sup>2</sup>, a pupil of Richter, devised the modern route through the cornea and under the name of keratonyxis, the operation became general. Cohn<sup>3</sup> in 1872 placed the puncture in the limbus and Kuhnt<sup>4</sup> in 1899 made it subconjunctival 2 to 3 mm. beyond the limbus. Langenbeck<sup>5</sup> was the first to employ a mydriatic—belladonna—in this connection, thus greatly facilitating matters.

Daniel seems to have been the first to have methodically performed and to have introduced to ophthalmic surgery an incision for cataract. This was a corneal flap incision. The considerable losses consequent on the corneal flap incision early induced attempts with linear incision. Hirschberg<sup>6</sup> states that as early as 1752 Pallucci had already suggested a corneal flap incision of only 1.5 mm. height and 4 mm. width for the regular cataract extraction. Reduction of the size of the flap incision for soft cataracts was tried in the eighteenth century (Pellier) and Gibson<sup>7</sup> of Manchester in 1811 wanted to make "punc-

ture" (today called linear extraction) the main procedure for soft cataracts. He first performed a discussion and after a few days punctured the cornea with his wide cataract knife pushing it into the lens if necessary. After retraction of the knife from the 3 mm. incision he inserted a spoon. He stressed the advantage of the small incision for secure healing and used it also for membranous opacities. Gibson, according to Hirschberg, should be regarded as the inventor of linear extraction for soft and membranous cataracts. Travers<sup>8</sup> in 1814, without preliminary discussion, made a quarter circle incision with a knife for soft cataract. He then opened the capsule and extracted the cataract if necessary with the help of a spoon. He strove for a minimum incision and for a method free from loss of vitreous and iris complications, also for one less difficult in the making, seeing that with such an incision, blepharostat and fixation forceps could be used with more confidence. Jaeger<sup>9</sup> in 1844 restricted the small incision to membranous and capsular cataracts and first gave the name of partial, later of linear, extraction to it.

However by 1848, when Graefe<sup>10</sup> traveled through Europe he found that linear extraction had been given up except for the extraction of capsular cataracts by Jaeger in Vienna. For soft cataracts of youth only discussion was being done. Graefe states in 1865, that errors in judgment of the consistence of cataracts and insufficient results in cheesy cataracts had brought Travers' method into discredit in his own country. It would seem to the writer that the aversion to corneal incision which de-

veloped in the pre-aseptic era because of the frequency of suppuration of the avascular corneal tissue, and in the course of years became a tradition, was also an important factor in the abandonment of corneal incision in favor of dissection. The inadequacy and the dangers attendant upon corneal incision as performed with the Graefe knife for the extraction of senile cataracts further prejudiced the ocular surgeon against any form of corneal incision. In the ensuing years there followed the numerous variations of corneal sections for hard cataracts, of Critchet, Graefe, and others, until the incision was placed in the limbus.

Although in the course of years many variations of intraocular instrumentation were devised to meet the problems offered by different types of membranous occlusion of the pupil, one does not find in the literature mention of any further original work on the actual principle of the operation of soft and membranous cataracts. To be sure, certain safety measures which, in quite recent years, have been devised for the flap extraction of hard cataracts, may, with advantage, also be applied to the extraction of soft cataracts; namely, the paralysis of the orbicular muscle of the lids with novocaine (akinesis) and the insertion of a guiding suture through the tendon of the superior rectus muscle. However the basic principles were evolved before the time of Graefe and have come down to the present time essentially unchanged. We thus arrive at present day methods.

#### Present methods

(1) **The operation of congenital cataract.** E. Fuchs points out that as small children cannot be expected to remain quiet after operation and the healing of a large wound would thereby be disturbed the making of the smallest possible wound—that of the dissection needle—is indicated. As general anesthesia is advisable up to the age of eight to ten years, dissection or needling is therefore generally used in small children. Elschnig<sup>11</sup> states that for congenital total cataract within the first two

or three years of age, dissection alone comes into practical question with the sole exception that, if the total cataract is very soft or liquid, so-called cataracta lactea, and the pupil well dilatable (which is usually not the case), a primary keratome extraction may be considered. He suggests in case of doubt that it is always best to needle first and then follow immediately, or after a few days, with keratome extraction. For older children or young adults he advises a preliminary needling followed by a secondary linear extraction. Today the needling of soft cataracts remains the method of election of most operators for children of all ages and it is often used for young adults as well. Needling is open to many serious objections such as the danger of chemical irritation and secondary glaucoma, which not uncommonly necessitates further operation upon a highly inflamed eye. Further objections are the long convalescence, the frequent necessity of repeated dissections in order to complete resorption, the delay of early restoration of vision in young subjects. Even retinal detachment may occur in adult years as the result of repeated dissections in early childhood. The writer has observed two such cases, in one of which a Japanese university professor became blind from retinal detachment of both eyes, the result it would seem of repeated dissections in childhood.

One can appreciate the reasons therefore that primary extraction (the original operation of Traverse) was again tried. Hess in 1897 became its main protagonist. He felt that dissection had all too often to be followed by a keratome incision and evacuation under much less favorable circumstances than if it had been done primarily and that an iridectomy had then to be performed because of the macerated condition of the inflamed iris. Better then he felt to have done the extraction primarily on an uninflamed eye. It was my privilege to see Hess do the primary extraction with keratome incision in the limbus during my period of three years assistantship with him and I have myself given this method a fair trial. Its objective is ideal

and it possesses distinct advantages over discussion in that a clear pupil, affording the possibility of visual development is more certainly and immediately achieved at an early age when this is most important. It also eliminates other objectional features and late complications of discussion. On the other hand, the hazards of iris entanglement and prolapse, often necessitating iridectomy (the latter is most certainly to be avoided in children) constitute a distinct disadvantage to this method. If we realize that, due to the exquisite vulnerability of the iris in the first years of life, the slightest manipulation—or iridectomy—is sure to cause it to shrink and occlude the pupil by being drawn up, we should be very hesitant about employing a method that admits of injury to iris tissue.

(2) **The operation for soft cataracts.** Whether the cataracts are congenital or acquired, after the age of eight to ten years operation is at the present time done under local anesthesia by discussion and secondary keratome extraction (incision in the limbus or cornea) one to three days afterwards. Some operators do not perform a secondary extraction but prefer to await the intraocular resorption of the cataractous masses with its risk of glaucoma, the probable need of repeated discussions, of a much prolonged convalescence and the necessity—as often as not—of a later secondary extraction having to be performed under unfavorable circumstances. Even in cooperative older patients the danger of iris entanglement in the wound is imminent if a round pupil has been maintained as it should be.

(3) **The operation of membranous cataracts.** What has been stated above applies *mutatis mutandis* also to this type of cataract. Discussion or extraction through a linear incision in or near the limbus are the methods of choice. A great number of different instrumental procedures have been described for the extraction of the membrane, a greater number perhaps than in any other branch of surgery for the achievement of one and the same object—in this case, an unobstructed pupil. It is beyond

the scope of this paper to touch upon them. Depending upon the individual operator's preference and the type of membrane to be operated upon, the hook, the forceps, the pince-ciseaux, and washing the chamber, et cetera, are used. With all the present methods however that retain the incision at the limbus there remains a not inconsiderable danger of iris entanglement, of vitreous loss and in consequence thereof a limitation of time and of freedom of mechanical movement is imposed upon the operator.

It is interesting to observe how in the course of centuries the pendulum has swung from the original discussion of the ancients to the linear extraction of Gibson and Travers; back again in the time of Graefe to discussion because of the inherent dangers of extraction; attempted return to linear incision and extraction by Hess in 1897 because of the objectionable features and inadequacy of discussion; and latterly the common use of discussion, often combined with secondary extraction in the belief that the combined procedure is more satisfactory than either one by itself. Yet the two procedures successively combined into one contain many of the objectionable features characteristic of each; and thus the present day methods described under the three above captions still labor under the same hazards and difficulties. A method which would decrease or obviate these dangers should offer great advantages. Such a method is the subject of this paper. It consists essentially in—

(1) A subconjunctival adrenalin injection of several minims at the limbus in order to produce hypotony of the bulbus and maximal dilatation of the pupil.

(2) A linear or oblique keratome incision within the cornea 1 or 2 mm. from the limbus according to the individual case.

Thereupon the intraocular manipulations and instrumentation indicated in the particular case may be performed with greater freedom and deliberation and the danger of the usual complications is reduced to a minimum.

The above method occurred to the

writer<sup>12</sup> in 1926 during the process of magnet extractions of intraocular steel. It seemed that the extraction of foreign bodies by the anterior route might be facilitated and the danger of entanglement of the foreign body in the iris, prolapse or iridectomy be avoided by adrenalizing the eye. After the usual cocaineization a deposit of adrenalin 1-

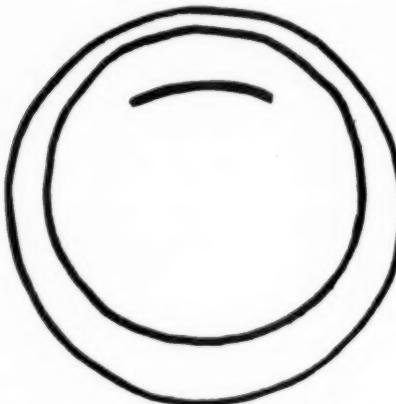


Fig. 1 (Barkan). Showing widely dilated pupil and line of incision well within clear cornea and pupillary margin.

1,000 was placed subconjunctivally at the limbus with a hypodermic syringe. After five or ten minutes, the pupil is maximally dilated so as almost to disappear behind the limbus. The dilatation, being due to a contraction of the sympathetic dilator fibres, is tonic in contradistinction to the paralytic dilatation of atropin and the iris consequently maintains an exaggerated contractility which retracts it from the wound and prevents its prolapse. This is in marked contrast to the well known tendency to prolapse of the flabby atropinized iris. Moreover the hypotony of the bulbus induced by adrenalin is such that the usual tendency of the ocular contents to prolapse is reduced to an astonishing extent. The vis a tergo is strikingly absent. The tendency to prolapse is furthermore practically eliminated by making the keratome incision oblique and within the cornea. The accompanying diagram number 1 shows the relative positions of incision and of iris according to this method. Diagram number 2 shows the positions according

to Hess and other methods commonly in use today.

The advantages of this procedure proved so striking that it was applied to other operations in the anterior chamber such as the removal of non-magnetic foreign bodies and of soft and membranous cataracts. Its application to small children that require a general anesthetic promised to be particularly beneficial and this indeed proved to be the case.

(1) **Adrenalization.** The tolerance of children to adrenalin is well known. No ill effects are noted in older subjects with the amounts injected, namely, from 4 to 7 minims. The systemic effect is lessened and the intraocular action increased by injecting as close as possible to the limbus with a fine hypodermic needle. The injection is facilitated by inserting the opening of the needle facing the bulbus when puncturing the conjunctiva. It is best to inject the major portion of the adrenalin in the meridian contiguous to the point of

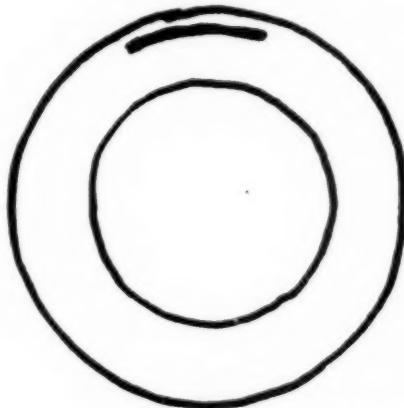


Fig. 2 (Barkan). Showing incision near the limbus and outside the margin of the partially dilated pupil.

corneal incision. The iris will then most certainly retract behind the place of incision. Anesthesia is prolonged and deepened; hemorrhage reduced to a minimum. This is not surprising when one considers the complete anemia produced by the injection. For general reasons a combination of gas and oxygen has proved the most satisfactory anesthetic but ether may be used with

equal safety for with the above procedure neither postoperative vomiting nor unruly behavior can damage the eye.

Adrenalinization, helpful as it is in itself, only comes to its full advantage when combined with a linear incision within the cornea.

(2) **Incision** is corneal, about 2 mm. from the limbus and oblique thus forming a valve incision which tends to close more the greater the pressure is within the anterior chamber, as for instance with unruly or vomiting patients. The desired size and obliquity of the incision depend upon the nature of the case and are matters of surgical judgment. The incision should be no larger than necessary for the extraction of the lens matter, membrane or foreign body, as the case may be. The larger and less oblique the more readily will it gape so that large masses will pass through it easily. The greater its obliquity the more secure and rapid will be its closure and the less danger of protrusion or of loss of ocular contents during or after operation. Excessive obliquity may interfere with freedom of intraocular instrumentation but the size and obliquity of incision can be adapted to the needs of the individual case with such nicety as to achieve an optimum of freedom of instrumentation, time for deliberate manipulation, security of healing and elimination of hazards.

There would seem today, in the era of strict asepsis, no longer to be any valid contraindication to the employment of a corneal keratome incision for the extraction of material of sufficiently small mass not to require a large gaping wound, unless it be the causation of increased or irregular corneal astigmatism. In a large series of cases this has not appeared to be true. Even if at a later date the astigmatism in a few of these cases should be found higher than usual, this would be but a slight disadvantage in contrast to the great advantages of the procedure.

The following case histories illustrate the application of this operative procedure in the various types of cataract mentioned in this paper.

**Case 1.** B. W., girl, aged three and

one-half years. Bilateral congenital cataracts. Only child. Family history negative. Born two weeks prematurely. Weight three and three-quarters pounds at birth. Convulsions after birth. Began to walk at two years of age. Advised by oculist six months ago to postpone operation. Mature cataracts both eyes. Vision of hand movements only, in front of the eyes. Circular rhythmical movements of eyeballs. Operation, R. E. June 18, 1929. Pupil dilated with atropin five successive days before operation. General anesthesia; ether. Under anesthetic, novocaine injection of lids (akinesis); subconjunctival injection of adrenalin at upper limbus and at "two and ten o'clock," resulting after 10 minutes in maximal dilatation of pupil. Keratome incision in cornea 2 mm. from limbus (oblique valve incision). As neither the point of the keratome would pierce nor the capsule forceps grasp the anterior capsule which proved to be a very tough and resistant membrane, it was pierced and extracted with a sharp hook. Semi-liquid and milky lens material was then evacuated, resulting in a black round central pupil. Binocular bandage. Child vomited after anesthetic and was difficult to keep quiet. After four days pads were removed; operated eye was uninflamed; pupil was black, round and central; the child examined her surroundings with much curiosity remarking upon everything she saw with the intense interest of an explorer in an unknown land. After four weeks, the other eye was operated on by dissection in order to compare the relative merits of the two methods. Knapp dissection knife pierced anterior capsule which was in the nature of an anterior capsular cataract and pushed it into the lower third of the pupil. Much of the liquid lens matter was evacuated through the dissection opening, the rest resorbed in the course of three weeks but the thickened anterior capsule occluded the pupil and showed no tendency to absorb. After two more weeks this was then extracted by means of the same procedure as used in the first eye (adrenalin injection and corneal incision) with the same immediate success as in the first eye. As soon as the child

began to use her eyes with correcting glasses, a gross nystagmus was apparent, showing that a marked degree of amblyopia was present. One and a half years after operation, corrected vision was approximately 1/20 in each eye. Presumably if the cataracts had been removed within the first year after birth, a good degree of vision would have developed for after operation the media were clear and the fundi appeared normal. This case illustrates the necessity of operation at the earliest possible age and this can be done with safety with the procedure described above.

**Case 2.** R. H., boy, aged four years. June, 1929. There was traumatic cataract in right eye caused by injury with thistle. Two months after injury the entire lens was cataractous with small amount of lens matter projecting into the anterior chamber through a little rent in the anterior capsule. As practically no absorption had taken place cataract was extracted. Operation. Atropin one percent four successive days before operation. General anesthesia; gas and oxygen. Akinesis of lids and subconjunctival adrenalin injection of 3 minims (1-1,000) at upper limbus. Waited 10 minutes, until submaximal dilatation of pupil. Keratome incision 2 mm. from limbus in cornea, definitely oblique making valve incision. Evacuation with two Hess shovels. Pupil black. Slight tendency of sphincter margins to be caught in wound noticed, but no tendency of iris to prolapse and at time of operation the surgeon was quite confident that there would be no anterior adhesion. Pupil remained dilated. Binocular bandage 4 days during which time there was vomiting, much fighting and unruly behavior, so that the nurses in the children's ward apologized for not keeping him quiet. The first dressing after four days showed a pale eye and central black pupil. We were not at all concerned throughout the four days. (The above is taken verbatim from the notes dictated at time of operation.) Corrected vision of this eye two years after operation was counting fingers at three feet. Poor sight was due to amblyopia of disuse. Complete absence of cooperation on the part of this child had

made it impossible to exercise the eye. This case, like the first, illustrates the safety of this operation in the case of young and unruly children.

**Case 3.** H. J., aged 32 years. Gradual failure of vision in eight months to 3/10 in the right eye; and 2/10 in the left eye, which prevented him from carrying on his work as barber. Partial posterior cataracts. General physical examination negative. Operation, January 29, 1931. Left eye: Subconjunctival adrenalin injection at limbus, akinesis, superior rectus suture, and retrobulbar anesthesia. Oblique corneal incision 2 mm. from limbus above. Point of keratome thrust into lens but only slight amount of cortical matter could be evacuated upon the blade. Much clear cortical matter evacuated with Hess shovels. After the nucleus of 3 mm. in diameter had been removed, the remaining posterior cortical opacity was attacked with the blunt hook, capsule forceps, Hess shovels and was extracted almost in its entirety. As the iris had almost disappeared behind the limbus and there was not the slightest tendency to prolapse, these maneuvers could be performed with perfect safety. Operation was done on the right eye February 24 with same procedure except that slightly larger incision was made and a large piece of anterior capsule was extracted with forceps with consequent smooth expression of nucleus and cortical masses on three spoons. The following day the anterior chamber was re-established; pupil round and almost black. March 15, discussion of a slight membrane performed in each eye resulting in corrected vision of 10/10 and Jaeger No. 1, each eye. In this case, the final result of corrected normal vision was obtained within six to eight weeks after operation on both eyes and that without the hazards or inconveniences of previous forms of operation.

**Case 4.** C. N., woman aged 45 years. Ten years ago right eye received a violent blow from the end of a rope. A few weeks thereafter the same eye was struck by a tennis ball. An English oculist diagnosed iritis and cataract, warning patient that operation might be necessary and that the eye might have

to be removed. Within the past four years the eye had become divergent. Present condition, February 11, 1926. Fifteen degrees of divergence on the perimeter. There is a hypermature somewhat shrunken cataract with tremulous iris; some atrophy of the iris stroma in its lower segment. At "four o'clock" there are two adhesions of the iris to the cataract. On June 2, 1926, the eye was straightened under local anesthesia. On April 10, 1927, the cataract was removed. Operation. Usual instillation of four per cent cocaine and 1 drop of adrenalin 1 to 1,000 with the second and fourth drop of cocaine. After the third drop, subconjunctival adrenalin injection of four minims at the upper limbus. Novocaine injection and suture into the superior rectus. After five to ten minutes, the eye was distinctly soft and there was maximal dilatation of the pupil above. Oblique keratome incision above, 1.5 mm. from limbus. The very tough capsule was grasped with forceps but iris adhesions did not give way without undue traction. Capsule was incised with cystotome and iris adhesions separated with the same instrument. Cortex now presented and the capsule was extracted with forceps, resulting in black central pupil. In spite of the complicating features there was absolutely no tendency to prolapse of either iris or vitreous, nor was reposition of iris necessary. The end result was round, central pupil with corrected vision of 10/10 and Jaeger No. 1. This case illustrates the advantage of the procedure in a very complicated type of membranous cataract.

**Case 5.** D. M., boy, aged four years. For ten days inflammation of left eye. There is an exceedingly minute foreign body imbedded in Descemet's membrane at the lower border of the pupillary area of the cornea. Iritis. The foreign body could be seen only with a strongly magnifying loupe. General anesthesia, induction with ether, continued with gas and oxygen. Attempt with magnet proved the foreign body to be nonmagnetic. Subconjunctival adrenalin injection. Submaximal dilatation of the pupil awaited. Operator wore a Zeiss binocular loupe which neces-

sitated his approaching within two inches of the eye. The foreign body was purposely pushed into the anterior chamber. Instead of dropping down into the angle of the chamber, it was drawn back by a strand of exudate by which it was attached to the pupillary border of the iris and so came to lie on the anterior surface of the lens. Oblique keratome incision within the cornea 2 mm. from the limbus was made. The foreign body was twice grasped with the forceps but slipped out. The forceps was inserted a third time, grasped the foreign body as it lay on the lens surface and extracted it. The pupillary margin of the iris being attached to the foreign body by exudate followed it up to the corneal incision. As the latter was oblique, the iris was stripped off at the inner wound lip and, due to the adrenalin tonus, snapped back into place. Binocular bandage. Very unruly behavior of child for four days. Removal of dressing on fifth day revealed a normal appearing eye. One year thereafter when seen again eye appeared untouched. Pupil, round, central, with normal vision. It would seem safe to say that with any other procedure the extraction of this minute foreign body lying on the anterior lens surface of the highly inflamed eye of a small child would probably have been attended with grave complications.

### Conclusion

(1) When combined with adrenalin hypotony and dilatation of the pupil, an oblique keratome incision within the cornea eliminates all hazards incidental to the linear incision of the past.

(2) The round pupil can always be maintained and iridectomy which, when performed in a child, stigmatizes it for life is never necessary.

(3) The opportunity offered for deliberate and, if necessary, prolonged intraocular instrumentation is a distinct advantage.

(4) General anesthesia may be employed with impunity and healing will be uneventful irrespective of the violence of the postoperative behavior of the patient.

Thus one is enabled to extract a con-

genital or soft cataract safely at an early age without the disadvantages of previous methods. Results of the removal of cataracts in early adult life have likewise proved satisfactory. The procedure has been found applicable and highly advantageous for the removal of mem-

branous cataracts, especially the more complicated post-traumatic and cyclitic types, and, last but not least, for the removal of foreign bodies from the anterior chamber in both children and adults.

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CONCERNING A MEMBRANE, BETWEEN THE VITREOUS  
AND THE ANTERIOR CHAMBER, SEEN AFTER  
REMOVAL OF THE CRYSTALLINE LENS  
AND ITS CAPSULE

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Removal of the crystalline lens allows a thin homogeneous membrane to be seen between vitreous and aqueous. It is separated from the vitreous by an optically clear space, and seems to extend as a hyaloid membrane over the entire front of the vitreous. Read before the American Ophthalmological Society, June, 1931.

In an article<sup>1</sup> presented before this society in June, 1930, it was stated that a membrane following intracapsular extraction of the lens had been noted and would be referred to at a future time. It is this structure which is the subject of the following discussion.

The removal of the crystalline lens with its capsule allows a thin, homogeneous, transparent membrane to be seen separating the aqueous from the vitreous. As early as the fifth day after intracapsular operation, or as soon as the patient can be safely examined with the corneal microscope and slitlamp, the vitreous will be found bulging forward through the pupillary space; but even at this early date, in most cases, there is a thin, though regular, membrane over the entire front of the herniated vitreous body. Brown pigment granules are scattered over the front of the vitreous or on the surface of the membrane if it is already visible. Sometimes the mass comes so far forward that it is in contact with the cornea. Usually before the sixth day, but in nearly every instance before the tenth day, a distinct, smooth, reflecting membrane will be seen with the narrow slit, coming from behind the iris and covering the vitreous. This membrane, unless there are complications, is transparent and exceedingly thin. It never appears to grow from one place to another, but is always evenly spread over the whole front of the vitreous (Fig. 1). As the eye is examined from day to day the vitreous, and in most cases the membrane also, will be seen to recede through the pupil until they lie entirely behind the plane of the iris. Retraction of the membrane usually continues until it is concave from before backward.

In some cases there are adhesions of the iris to the membrane, but the membrane is generally free and always comes from behind the iris (Fig. 2). Where an iridectomy has been performed the membrane disappears be-



Fig. 1 (Cowan). Appearance of membrane when first seen with narrow slit.

hind the limbus haze. Whether the membrane is finally convex, flat, or concave, the vitreous continues to recede, and there is seen a distinct, clear space which corresponds to the retro-lental space of a normal eye (Fig. 3). Occasionally the whole process will be found complete as early as eight days after operation, but it usually takes a longer time, often several months. Sometimes the rate of retraction of the vitreous is much greater than that of the membrane, so that while the membrane still protrudes into the anterior chamber, the vitreous lies well behind it,



Fig. 2 (Cowan). Intermediary stage.

even behind the iris. An exaggeration of this was found in B. J., nine days after operation by Dr. Paul Pontius at the Wills Hospital. Here the membrane came so far forward that it was in contact with the cornea and its conformation was almost hemispherical, while the vitreous, separated by a clear space, lay behind the pupillary plane.

In the case of E. M., operated on at the Wills Hospital by Dr. Leighton F. Appleman, the membrane was found to



Fig. 4 (Cowan). Globules and crystal bodies on membrane.

be extremely irregular, due to the formation on its front surface of innumerable, small, transparent globules or vacuoles and many glistening, crystal-like bodies (Fig. 4). The membrane as a whole was translucent and gave a yellowish reflex. It lay behind and free from the iris and was separated from the vitreous by an optically clear space.



Fig. 3 (Cowan). Final stage, showing space corresponding to retro-lental space of normal eye.

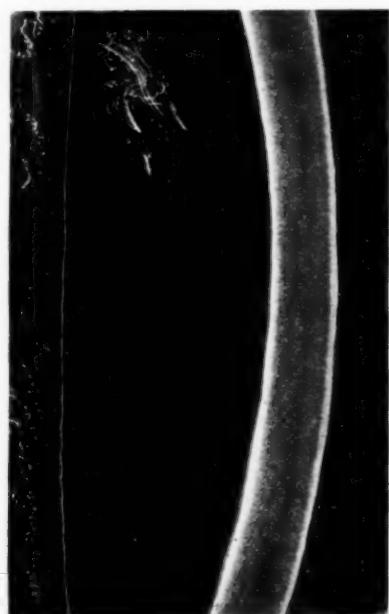


Fig. 5 (Cowan). Portion of vitreous caught in front of membrane.

The vision was very low. This was probably the type described by Millette.<sup>2</sup> With oblique illumination and ophthalmoscopic examination of 3,500 eyes after intracapsular lens extraction, he found seven cases in which there was an almost opaque membrane that resisted treatment. It is unfortunate that he made no slitlamp study. All of Millette's seven patients were diabetics; Dr. Appleman's patient was not.

Rarely a portion of the vitreous seems to have been caught in front of

brane which comes forward and is caught in a corneal scar. This patient, R. G., aged 11 years, came to the dispensary of the University Hospital, service of Dr. Holloway, in January, 1929. A linear extraction had been done at another hospital in January, 1924, followed by dissection in December, 1924; but the membrane is intact and shows no sign whatever of having been cut. Membranes of this kind have been frequently described. The conformation is due to its attachment to a scar.

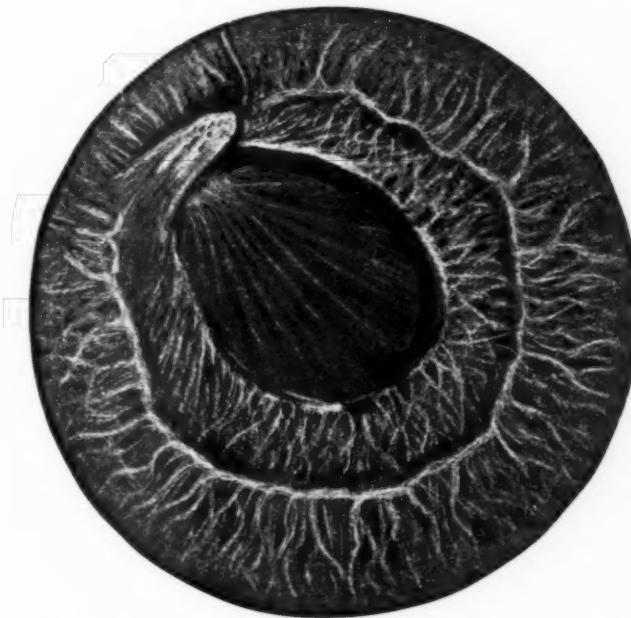


Fig. 6 (Cowan). Membrane included in corneal scar.

the membrane (Fig. 5) and remains in the anterior chamber. In a few cases no membrane can be seen.

This membrane bears no relation to the homogeneous, zonular lamellar or capsular lamellar membranes discussed by Dr. T. B. Holloway in conjunction with the writer in a previous article<sup>1</sup> although there is a striking resemblance between them. The pigmentation is the same in both—the type that T. Harrison Butler<sup>3</sup> claims to be characteristic of a vitreous film.

The membrane which is the subject of this paper is similar to those seen after injury, capsulotomy, and other conditions. Figure 6 illustrates a mem-

brane which comes forward and is caught in a corneal scar. This patient, R. G., aged 11 years, came to the dispensary of the University Hospital, service of Dr. Holloway, in January, 1929. A linear extraction had been done at another hospital in January, 1924, followed by dissection in December, 1924; but the membrane is intact and shows no sign whatever of having been cut. Membranes of this kind have been frequently described. The conformation is due to its attachment to a scar.



Fig. 7 (Cowan). Hemorrhage in anterior chamber retained by invisible membrane.

border of the pupil. While no membrane could be seen, in the most dependent part of the hernia there was a hemorrhage that appeared to be suspended in a hammock. A glance at the illustration makes it certain that this hemorrhage must have been retained by a delicate, film-like structure. In a recent case of spontaneous lens absorption<sup>4</sup> there was, after every vestige of lens and capsule had disappeared, a membrane identical with the one described, except that it contained no pigment granules.

Neither can this membrane be the result of a condensation of the vitreous front. It never has an irregular surface conformation, but is always smooth and not everywhere in contact with the vitreous. It is separated from the vitreous by an optically clear space. Condensation of the vitreous surface must surely be ruled out in such cases as illustrated by figure 6, in which the membrane might be a proliferation, but is most certainly not a condensation.

Ziegler<sup>5</sup> described a membrane that he called adventitious and which occurred after capsulotomy. Most probably this was merely a dense, inherent hyaloid. Fink<sup>6</sup> discussed such conditions in 1894 and was of the opinion that Juler's view was the correct one, namely, that certain forms of so-called

cataract at the posterior pole of the lens have no connection with the posterior layer of the capsule of the lens nor with the lens itself, but that they are really opacities in the hyaloid membrane. Fink explained the formation of stellate posterior polar cataract as due to traction by a thread of fetal hyaloid artery in the center of its attachment to the hyaloid membrane. A similar process was seen to take place in the case of P. J., at the Wills Hospital. Twenty-one days after intracapsular lens extraction by Dr. Appleman, there was the usual smooth, flat, transparent membrane behind the iris; but attached to the posterior surface of the membrane, extending from "3 to 9 o'clock," was a narrow, spindle-shaped clot of blood. Two months later the blood was replaced by a dense, white scar which, in its contraction, had drawn the membrane into fine traction folds as illustrated in figure 8. Incidentally, it is reasonable to suppose that a better opening in a membrane of this type will be obtained when the incision is made at right angles with the folds rather than parallel to them.

In spite of the varied opinions by authorities on the subject, it is felt that a careful slitlamp study of the eyes after removal of the lens and capsule can leave no doubt of the existence of a dis-

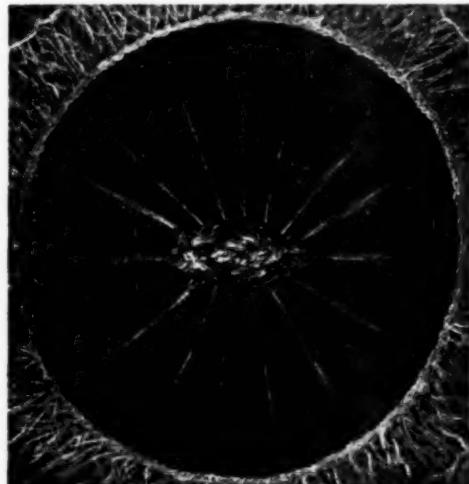


Fig. 8 (Cowan). Membrane drawn into traction folds by scar from organized hemorrhage.

tinct, homogeneous, hyaloid membrane over the whole front of the vitreous. Immediately after the support of the lens is removed the hyaloid membrane is pressed forward by the vitreous and is so stretched and thinned that it might not be seen. After regaining strength and elasticity, the membrane gradually forces the vitreous back and then acts as a retaining wall for the formation of the clear space between it and the vitreous. That the aqueous is a factor is certain, as is evidenced when the membrane curves backward.

The ideal result; therefore, of intracapsular extraction will be a clear anterior chamber, an almost flat, transparent membrane just behind the iris, and an optically clear space between the membrane and the vitreous. Free vitreous in the anterior chamber, during or after operation, is evidence of

a break in the hyaloid membrane. A small opening will result, probably, in the condition shown in figure 5. The type of membrane shown in figure 4 is probably due to some local or systemic disease.

Finally, in the opinion of the writer, the retro-lental space is behind the hyaloid membrane, not in direct contact with the posterior capsule of the crystalline lens, and whether or not this space contains aqueous fluid, it is separated from the posterior chamber by the hyaloid membrane.

In a laboratory investigation now under way with Dr. Wilfred E. Fry, regarding the hyaloid membrane and the retro-lental space, the experimental results promise that more definite findings will be ready for presentation in the near future.

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## MEASLES ENCEPHALITIS

### A clinical report of some eye findings

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The history is given of a boy six years old who became blind suddenly on the eleventh day of an hitherto uncomplicated measles attack. Clinically typical encephalitis followed. The ophthalmoscopic findings resembled those of bilateral arterial embolism. Visual recovery was complete but personality changes persisted. Read before the American Ophthalmological Society, June, 1931.

Measles with encephalitis as a complication is rarely observed. Boenheim<sup>1</sup> wrote that in six thousand cases of measles, nerve complications occurred in twenty-three, of which six were of the nature of encephalitis. This is a percentage of 0.1. In 1928 Ford<sup>2</sup> published a summary of the clinical and postmortem studies that had appeared in the literature up to that time. He totaled one hundred and twenty-five cases, of which twelve were his. In this series, eighteen or nineteen were reported with postmortem studies. Greenfield<sup>3</sup>, in 1929, reported observations on four more patients with one necropsy study; Walthard<sup>4</sup> reported on one such study and Zimmerman<sup>5</sup> and Yannet added a case with necropsy studies. In a series of fifty-five case reports of encephalitis at Herman Kiefer Hospital eleven were classified as measles encephalitis. There were four deaths in this group. No mention was made in the literature cited, and in other reports consulted but not cited, of any ophthalmoscopic and clinical picture similar to that observed in the case reported below.

#### Clinical history.

J. P., a boy of Italian parentage, aged 6 years, was brought to Harper Hospital, April 9, 1930. The following history was obtained from the parents and the child's physician. The family history was not important other than that there had been exposure to measles. The patient was a first child, normally born after an uncomplicated pregnancy. The child had been breast fed and there had not been any serious sickness before the present attack. He had been an average boy in all respects with good general health.

#### Present illness.

Measles had begun eleven days prior to admission with the typical onset. There had been a rash and, later, convalescence. The temperature had not been high and on the eleventh day he had arisen alert, happy, and able to see. At noon, without complaint, it was noted that he groped about in a confused manner. He also appeared indifferent to his surroundings. The father established to his own satisfaction that the boy was blind. He was then sent to the hospital and was seen the same afternoon, the eleventh day following his initial measles attack.

#### Examination.

Temperature was 99°; the pulse rate 90; respiration rate 24. The boy was well nourished, quiet in bed, indifferent to his surroundings and complaining of no pain. There was no stiffness in the neck. The skin showed scarcely a trace of eruption and no petechiae. There was a moderate anterior cervical adenitis. The ear, nose, and throat examination showed nothing of significance. Chest and heart were normal. The spleen and liver were not palpable. Dr. Ward Harryman, who made the neurological examination, reported that the knee jerks were obtained only on reinforcement. The abdominal reflexes were absent. Kernig's and Babinski's signs were present on the right side. The fifth, seventh, eighth, and ninth nerves showed no disturbance. There were no tremors nor evidences of paralysis.

#### Eye examination.

The eyes were noted to have a somewhat irregular motion, attracted to-

ward sounds, not influenced by light. There was some dissociation of the eye movements. Pupils were unequal and were varyingly dilated from two-thirds to nearly maximum. The dilatation varied in each eye in a period of several hours. There was no exophthalmos, bruit, nor increase of intraocular tension. On command the child could move his eyes about in all directions. There was no swelling of the lids. The conjunctivas were clear and not congested. There was no evidence of discharge. Ophthalmoscopic examination showed in the right eye: clear media; nerve head slightly elliptical vertically; a distinct pallor of the nerve head and a distinct loss of capillary color, without loss of substance. A thin, hazy edema blurred fine details in the physiological depression of the nerve head. The lamina cribrosa was not seen. Both pigment and scleral rings were partially obscured. The most extraordinary picture was seen in the arteries which were reduced practically throughout the fundus to threads and apparently were carrying little, if any, blood. The veins were dark in color and were reduced in caliber throughout, but relatively to the arteries were engorged. No pulsation was seen. No marked increase of opaqueness was seen along the course of the vessels. The entire retina showed definite loss of transparency not associated with hemorrhage or exudation. In the macular area the foveal reflex appeared a deep red, somewhat diffuse, through a more exaggerated overlying nontransparent retina. The left eye presented essentially the same picture. In both eyes appearances closely resembled bilateral embolism of the central arteries.

#### Laboratory findings.

On April 10 the blood count showed red blood cells 4,560,000; white blood cells 11,500, with 48 percent polymorphonuclears; lymphocytes 52 percent. Examination of the urine was essentially negative. Spinal fluid was under moderate pressure. Cell count was eight; sugar reduction 45; colloidal gold reading all zeros; culture negative. The blood culture was also nega-

tive. Protein in the blood measured 0.9 grams per liter; cholesterol 230 milligrams. Second spinal fluid examination showed increase of sugar to 54.

#### Other findings.

Blood pressure readings varied from 84/40 to 77/40. In the second week at times the pressure fell still lower, especially the diastolic pressure; one measurement of 26 was recorded. The temperature remained within half a degree of normal either above or below.

Neurological examination showed the usual shifting of the deep tendon reflexes and abdominal reflexes. The emotional state of the patient varied greatly; at times he was lethargic, at other times excited, singing, trying to get out of bed; or he was indifferent, relaxed, and quiet. Occasionally he recognized his parents by their voices and remarks. Roentgenologic examination showed uniform clouding of both maxillary sinuses and infiltration of the right ethmoid group of cells. The frontal sinuses were undeveloped. There was no frank evidence of intracranial disease shown on the x-ray films. Clinical examinations indicated that there was sinus disease.

Ophthalmoscopic examinations were made at intervals several times a day and showed but little change during the first week. At the end of a week there was some persistent increase in the diameter of the arteries. The retina by this time was more opaque and seemed more edematous. Blood vessels were more obscured as though suspended in a less transparent or translucent medium. On the seventh day the patient's eyes responded to light stimuli for a short interval. There was no increase in the caliber of the retinal arteries following inhalation of amyl nitrite. Heavy sweating from heating with an electric blanket produced slight temporary enlargement of the caliber of some of the arteries. The same phenomenon was observed following foreign protein injections, typhoid vaccine intravenously given, sufficient in amount to cause a temperature of 103°F. Considerable apprehension was felt that the long-continued anemia would cause

necrosis and permanent loss of sight. At the end of the first week in the hospital it was noted that on the left nerve head there were two small capillary hemorrhages and in the macular region were short lines and diffuse dots arranged in a regular manner, neither radiating from, nor tangential to, the macula. These lines did not coalesce and increased in width. In the periphery were noted similar lines which looked like short fuzzy wool yarns of lighter gray color than the surrounding nontransparent retina. On the tenth day the child suddenly announced that he could see. Tests with objects bore this out. The fundi showed more filling of the arteries. From this time on there were irregular but steady increases in diameter of the arteries until on the twenty-third day, when he was discharged, they were nearly normal in caliber. The nerve heads still appeared pale. (This persisted for many months.) With restoration of vision and increase in the diameter of the arteries the edema in the retina or loss of transparency, irregularly disappeared. At the end of six months it was noted that the arteries and veins were nearly normal in caliber and the retinas were transparent. Exceptions consisted of fine pigment somewhat lineally arranged in the macula and irregularly disposed, and definite fine pigment tracery throughout the extreme periphery as viewed with the ophthalmoscope. Unfortunately, it was not practicable to make visual field studies because of the patient's inability to cooperate. On March 16, 1931, the child's vision was 6/7, uncorrected, in each eye, and with a minor correction for astigmatism and far-sightedness it was improved to 6/6.

Residual sadistic personality changes made it unpleasant for the remaining children in the family as well as his parents. The personality changes became so unpleasant at home that the child was committed to a home for the feeble-minded. Of course, the child was not feeble-minded and had a normal intelligence quotient. His emotional disturbances made him unsocial. Ophthalmoscopic residual phenomena consisted of

a few linear pigment opacities in the macular areas and fine pigment traceries and dots in the extreme peripheries.

### Comment

Encephalitis, complicating measles, resembles that complication in many other diseases. The immediate clinical signs and symptoms are independent of the kind of threshold over which the disease enters. The onset is varied but usually is sudden, often accompanied by nausea and vomiting and a rise in temperature. A characteristic clinical finding in this disease is the shift of signs, and those concerning the eye are no exceptions to this rule. Anatomical reports emphasize that in epidemic encephalitis it is the gray matter, chiefly the central gray matter, in the vicinity of the substantia nigra, according to Zimmerman-Yannet, that suffers, while after measles the encephalitic lesions are rather sharply limited to the white matter. These two, apparently differing forms of the disease, may be unlike in name only. That is, if what seems likely is true, that the epidemic form is a complication of influenza. On the other hand, it can be said that the disease with which encephalitis is associated performs the rôle of introducer or starter to a specific encephalitis, organisms of which may be constantly present. But there are well known forms of encephalitis, nonspecific in character, as that associated with poisoning from the heavy metals. Epidemiology is still unequipped with sufficient facts to separate and classify completely the various forms of this disease.

Disturbance of the muscle balance and ptosis are very common: Pupillary reactions are altered. Neuroretinitis, mild or severe, usually mild, if present at all, is frequently seen. There are sometimes disturbances in coordinated movements and many other effects upon the eye due to lesions in associated portions of the central nervous system. In some cases the eyes escape entirely. After-effects in encephalitis are of greatest importance, particularly from the prognostic angle. Too few cases have been thoroughly studied to

make knowledge of residual phenomena concerning the eye available.

It is very unlikely that an opportunity will ever arise for an anatomical study of a similar case. It is necessary to explain the underlying factors, mechanical or other, partly on theoretical grounds. Those present at the meeting of the American Ophthalmological Society last year will remember Dr. Holloway's<sup>6</sup> report of a 65 or 70 year old man, suffering from a vasculorenal disease and high blood pressure with high blood-urea-nitrogen. This patient showed a rapidly, progressive loss of vision in the left eye for three days; similarly in the right eye for two days. When first seen, light perception only was present in each eye. The discs were white and some edema was present. The whole posterior pole of the eye, extending on the nasal side of the disc beyond the macula, presented a marked fogbank appearance similar to that seen after obstruction of the central artery. Twenty-four hours later there was slight improvement, but this was complicated by a marked rise in intraocular tension. The latter was controlled by vigorous general and local treatment; tension returned to normal again after 48 hours and remained so. There was no evidence of chronic glaucoma. Dr. Holloway attributed the fundus changes to cerebral edema. He mentioned a report of Williamson-Noble<sup>7</sup> on "Macular changes associated with thrombosis of the central retinal veins". Williamson-Noble concludes that in cases of thrombosis of the central retinal vein, "A varying degree of edema develops in the region surrounding the fovea, causing a varying degree of damage to the structure in the retina of this region. This lesion, on the theoretical side, explains the peculiar limitation of edema following Leber's work and entoptic observation with a stenopalic hole showing that the fovea is devoid of retinal blood vessels. Consequently, this area is surrounded by a zone of minute terminal capillaries to an extent which does not exist in any other part of the retina; hence, in cases where the venous return is blocked edema would be most likely to occur in the perimacular

region. The external molecular layer represents what may be termed a watershed between the choroidal and retinal vascular system. In other words, if either system were interfered with, this layer would be the first to suffer. The retina around the fovea is thicker than it is elsewhere, so that the layer referred to is further from the choroidal circulation. Hence, it is the external molecular layer which would be principally affected by deficient retinal or choroidal blood supply". This explanation is adequate in the one-sided, secondary macular lesions, but does not explain those cases in which the disturbance is bilateral and uniform in each eye. In the case here reported the macula and peripheral retina were simultaneously and nearly equally involved. The same mechanism was operating in each eye. Only two minute hemorrhages were seen. This eliminates consideration of interference with venous return. The entering retinal blood supply was affected primarily. Low blood pressure following large loss of blood has led to permanent blindness from the resultant anemia of the retina. Extraordinary in the case cited is the restoration of vision after the long-standing anemia of the retina. The appearance of the macular region with a red foveal reflex coming diffusely through the only partially transparent retina suggested that the lesion was confined largely to the arteries, as did the restoration of vision with increase of caliber of the arteries. It is likely that choroidal blood supply was unimpaired and that nourishment was supplied to the outer retinal layers. Complete bilateral central artery embolism would explain the initial ophthalmoscopic appearances. The recovery of vision, with somewhat irregular return, is unlike embolism. Bilateral emboli are unlikely as causes of the anemia due to the completeness of the stoppage. The bilateral changes and the absence of severe edema on the nerve heads imply that the lesion was not within the nerves and also argues against increased intracranial pressure. There was no proptosis of either globe.

The temporary increase in caliber of

the arteries following the use of the foreign protein injections and sweats, implies that nervous control was not lost in the retinal vessels. Arguments against arterial spasm were the uniformity and totalness of closure of the vessels as well as the duration of the process. The symmetrical and bilateral distribution of the eye lesions, associated with the obviously severe central nervous system disease, forces us to conclude that the site of the retinal lesion lay in the brain. The lesion probably consisted in a localized edema or inflammatory process, perhaps associated with anomalous vascular arrangements.

#### Summary

The history is given of a boy, aged six years, of Italian parentage, who in

convalescing from a moderate attack of measles, on the eleventh day had sudden complete loss of sight without other signs at the time. Clinically he soon showed typical encephalitis. The child had alternate intervals of lethargy and of excitation. The eye signs varied so far as the size of his pupils and muscle balance were concerned, but for a period of over a week there was an ophthalmoscopic picture similar to bilateral central retinal arterial embolism.

He recovered his vision almost completely with minor residual changes so far as ophthalmoscopic findings were concerned, but he has continued to show distinct personality changes and behaviorism disturbances with sadistic tendencies.

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## THE TREATMENT OF PAINFUL ABSOLUTE GLAUCOMA AND OTHER EYE DISEASES WITH RETROBULBAR INJECTIONS OF ALCOHOL

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BUDAPEST

(Translated by Dr. W. H. Crisp)

One cubic centimeter of eighty percent alcohol is injected near the posterior pole of the eyeball for the relief of the pain of absolute glaucoma. The eyeball becomes anesthetic and immovable. For a few days there is protrusion of the globe with chemosis and stain. Five cases are reported in which the procedure was employed. In one the pain recurred owing to a bony shell within the eyeball necessitating enucleation. In another the presence of an intraocular melanosarcoma brought about return of pain necessitating removal of the globe.

Alcohol injections have been used for a long time in the treatment of trigeminal neuralgia. Kulenkampff has not done trephining since 1919, and he declares that he has never seen trophic disturbances (neuroparalytic keratitis). Double vision does occur, but soon disappears.

The Marburg ophthalmologist Grüter was the first to employ alcohol injections for the relief of pain in eyes which had become blind. He described his procedure as follows: After cocaineizing the conjunctiva, one cubic centimeter of two percent novocain solution is injected to right and left of the eyeball in the neighborhood of the posterior pole, by means of a curved Siegrist needle. After five minutes a like quantity of eighty percent alcohol is injected in the same manner and in the same region. After another fifteen minutes the eyeball is entirely anesthetic. All the ocular muscles are paralyzed, and the eye is immovable. An inflammation of the orbital connective tissue follows, with protrusion of the eyeball, chemosis, and stain. I cannot support Grüter's opinion that this simple procedure may be carried out in the surgeon's office. Although general symptoms do not arise, it is advisable to put the patient into the hospital.

This procedure is especially suitable for dealing with painful absolute glaucoma in elderly people. Physically and psychically these patients do not tolerate removal of so important an organ. The danger of sympathetic ophthalmia does not exist in these eyes, since there was no antecedent injury.

My first case was in a woman of fifty-

nine years. In 1929 she had had a classical iridectomy done on the right eye for subacute inflammatory glaucoma, without objective or subjective improvement. No benefit was obtained from aminglaucosan, two drops, followed by corneal puncture. Because of the painful condition of the almost blind eye (only uncertain light perception, no projection) alcohol injection by Grüter's method was undertaken. Pain ceased from the second day, and the initial chemosis and exophthalmos soon disappeared. Oculomotor paresis remained, but there was permanent relief from pain. The patient was able to use her sound eye without disturbance, and was happy at having escaped enucleation.

My second patient, a seventy-five-year-old quiet psychotic, suffered from severe pain in the glaucomatous right eye, which was stony hard. The left eye had poor visual acuity. Because of the objections of the family and of the patient, enucleation could not be considered. Alcohol injection was well tolerated, and the pains ceased. In this case also there was permanent oculomotor paresis, and the conjunctiva was anesthetic.

My third patient was a physically and mentally retarded girl. The right eye had been blind since secondary glaucoma following iridocyclitis in early infancy. The left eye was extremely myopic. After alcohol injection the pain became less severe. Noteworthy in this case was a persistent abducens paresis with partial oculomotor paralysis, and also a very extensive initial edema. Six weeks after the patient was dismissed

the eye had to be enucleated on account of return of the pain. Dr. Kovacs Endre, prosector of the hospital, reported the following findings: "The eyeball retains its spherical form, and shows no decided squaring. The inner surface of the eyeball is lined with a thin shell of bone (0.5 to 1 millimeter average thickness) almost spherical in shape." It is evident therefore that the increased pain in this case was attributable to the bony shell and shrinkage of the eyeball.

My fourth case was in a sailor of sixty-three years. Enucleation of the left eye had been refused eighteen months previously. There was the typical picture of painful absolute glaucoma, with complicated cataract; no light sensation, tension 70 mm. Hg. After alcohol injection the pain stopped, although the eye did not become softer.

From the course of these four cases it is evident that alcohol does not have a uniform influence upon the nerves and the ciliary ganglion. In three cases the oculomotor nerve trunk, and in one case chiefly the abducens nerve was affected. Among the muscles which are innervated by the oculomotor nerve, the one most affected is the levator. The ptosis is always very pronounced, and the ability to raise the lid is especially slow in returning. It seems that the fibers which innervate the levator lie in the outermost layer. They are therefore most intensively affected by the alcohol, since perineuritis or chemical necrosis develops first in this location and continues longest.

My last case, the fifth, is the most interesting. It raises the question whether we ought to limit the use of alcohol injections to cases in which the diagnosis of primary absolute glaucoma is beyond doubt and we are entirely satisfied that the glaucoma is not caused by an intraocular tumor. Unfortunately I encountered such a case, the history of which follows.

A woman of fifty-five years came with the complaint that the left eye had been blind for three years, having been operated upon at the beginning of that period, presumably for retinal detachment. For two and a half months she had had severe pain in and around the

eye. The right eye was normal, its vision with minus 6.00 D. sphere being 5/10?; the left eye showed the picture of painful absolute glaucoma. The dilated pupil was occupied by a homogeneous, gray, cataractous mass, there was no light perception, the eye was hard, 60 mm. Hg.

As the patient would not consent to enucleation, I gave an alcohol injection in the usual manner. During the first days after the injection the pains were absent, there was protrusion of the eyeball, and oculomotor paresis developed. Later the pain returned in increasing severity. A week after her dismissal she returned and gave her consent to enucleation on account of an increase in the boring pain.

Histological examination of the eyeball showed a dark brown, almost black, soft, friable mass of tissue, filling the interior of the eyeball and organically connected with the outer coats, especially with the scarcely recognizable remains of the iris. Diagnosis: fusocellular melanoma.

Retrobulbar alcohol injections have also been used on seeing eyes for the relief of pain. Wecker used dilute alcohol (twenty to forty percent) in cases in which the pain could not be overcome by other means, for example in glaucomatous iritis. I should not be disposed to risk endangering a seeing eye by retrobulbar injection of alcohol, and cannot recommend the procedure for a case of this class.

Recently experiments have been made with eighty percent alcohol injections for essential and spastic entropion.

Both retrobulbar and palpebral injections of alcohol are capable of extensive application. It will be worth while to undertake cautious experiments with this procedure. As already said, I should not venture to inject alcohol in the vicinity of the optic nerve of seeing eyes. Even in cases of absolute glaucoma we must proceed with a certain amount of caution. We must particularly be careful to consider whether a new growth is concealed behind the complicated cataract, and is responsible for the increased tension and the pain.

*V Nador-Utca 11.*

# NOTES, CASES, INSTRUMENTS

## THE LIGHT BAND IN RETINOSCOPY

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It is a well known fact that the appearance of a light band in the pupil during a retinoscopy test is a definite sign of astigmatism. The practical utilization of the light band is largely in the determination of the axis. However, it is not often that the light band appears in such distinct form that definite dependence can be placed on it. It was shown long ago by Dr. Jackson and others that the band is most distinct when the examiner is at the point of neutralization of one meridian and the light source is at the far point of the other, the relatively defective meridian. A working mental picture of the focusing process can be obtained by assuming, for example, that the vertical meridian is neutralized at 26 inches (66 cm.), the horizontal meridian still shows a "with" movement because it is focused, for instance, for infinity. Using a luminous plane mirror retinoscope, the bulb so set that the light leaving the mirror is parallel, this light is sharply focused by the horizontal meridian of the examined eye. In the vertical meridian the light is over-converged as this meridian having been neutralized at 26 inches (66 cm.) is 1.50 diopters myopic. The retinal image of each objective light point is a short vertical line and the whole vertical light band here is most distinct.

It would seem at first thought that the usefulness of the light band could be increased by the application of a movable light source. At the stage of neutralization of one meridian the light source could be so shifted until the light band was most distinct. At that point the light source would be at the far point of the meridian still to be neutralized. Such an arrangement could be most easily obtained mechanically with a luminous retinoscope. By slightly shifting the position of the bulb or the

condensing lens the virtual light source could easily be placed at any desired distance. In practice, however, the value of such a movable arrangement is very limited and hardly worth the trouble. For a working distance of 26 inches (66 cm.) a fixed position of the virtual light source 13 inches (33 cm.) behind the mirror seems about the best arrangement. The light leaving the mirror with a divergence of 3 diopters, reaches the patient with a divergence of one diopter. Such an arrangement can be easily obtained with a luminous retinoscope.

A few illustrations will show the limitations involved in shifting the light source. Suppose we found at a 26 inch (66 cm.) working distance a "with" movement in all directions and that after we neutralized the vertical or approximately vertical meridian with a plus 2.00 sphere, the horizontal meridian still showed "with" motion. This meridian is now in focus either for parallel light, far point at infinity, for convergent light, far point negative, or for divergent light of less than 1.50 diopter divergence, far point beyond 26 inches. If it is in focus for parallel light, the light band will be most distinct when the virtual light source is placed at infinity. But as soon as a plus cylinder is inserted for neutralization purposes, for example a plus .50, the best position for the virtual light source is no longer infinity. It is now at 80 inches (2 m.). The next cylinder inserted will again require a shift in the position of the virtual light source. If, in the illustration, the horizontal meridian is focused for convergent or slightly divergent light, similar considerations hold true in that each plus cylinder interposed necessitates a new position of the virtual light source in order to place it at the far point of the defective meridian.

A feasible application would be to shift the light source only once at the beginning of the examination when the astigmatism is at its highest, in order to determine the direction of the light

band and thereby the axis position. Cylinders may then be placed with the axis in this determined position without further reference to the light band. The limitation even of this procedure is that it can be applied only in cases where plus cylinders are used. Where minus cylinders are used to neutralize an "against" motion, the far point of the defective meridian is in front of the mirror and only the use of a concave mirror can place the light source there. As minus cylinders are preferably used in retinoscopy the use of a movable light source would through this factor alone be of little practical value.

A fixed virtual light source 13 inches (33 cm.) behind the mirror and therefore 40 inches (1 m.) from the patient seems a good general arrangement for the reason that when neutralization is obtained in one meridian, for example the vertical and the horizontal meridian still shows "with" motion, the clearness of the light band will be at its maximum when the error is .50 diopter. Of course the band now, because of the small error, is broad and diffused. If the error is higher than .50 diopter, the light band will be indistinct because the light source is then not at the far point of the defective meridian, but it will be more concentrated because of the higher error. With the interposition of plus cylinders for neutralization purposes, the light band should gain in clearness of direction, because the far point of the defective meridian is brought closer to the position of the virtual light source. This also holds true in the far more important case of using minus cylinders. The interposition of neutralizing cylinders brings the far point closer to the position of the virtual light source and thus tends to produce a more sharply defined light band. On the whole, however, the exact position of the cylinder axis in retinoscopy can only with difficulty be determined through the light-band. The application of cylinder retinoscopy lends itself better for such work, especially where no reliance can be placed on the subjective verification.

## CONGENITAL (FETAL) INTERSTITIAL KERATITIS

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Congenital interstitial keratitis, or that form of keratitis which has had its origin in utero and is found to be present at birth, must be exceedingly rare, as the condition is mentioned but seldom in ophthalmic literature.

De Schweinitz<sup>1</sup> in referring to interstitial keratitis, says: "It is probable that the affection occasionally arises in utero, and a congenital form of interstitial keratitis not differing in appearance from the ordinary or postnatal form of the disease has been described (Randolph)". In a very careful search of the literature I have been unable to locate this description of Randolph's, so it may have been given informally before some ophthalmic organization.

Fuchs<sup>2</sup> states that congenital defects are of two kinds, one depending on an interference of development (malformations, in the narrower sense of the word), the other on some disease of the fetus. A sharp line of distinction between the two cannot be drawn in all cases.

He further states<sup>3</sup>, in discussing anomalies of the cornea, that "other opacities are the results of fetal disease (parenchymatous keratitis or gonorrhreal conjunctivitis, which have produced scars or staphylomata) or birth injuries (injuries from the forceps)".

In a chapter on interstitial keratitis in the American Encyclopedia of Ophthalmology<sup>4</sup> it is stated that Parinaud found the disease present before birth.

During a service of many years as consultant to a large lying-in hospital I never had the opportunity of observing a case, and the following notes are of the only infant that I have ever seen with this condition:

L. C., born January 6, 1931, was observed by the attending physician to have had opacities of both corneas at the time of delivery. Six days later the patient came under my observation. For two days there had been some symptoms of thymus gland involve-

ment; the x-ray showed thymus to be present, and treatment was given. There were marked opacities of both corneas in the deeper layers, occupying about four-fifths of the corneal area, with a central portion in each cornea somewhat less dense than the opacity of the surrounding corneal tissue. There was an outer ring in the periphery of each cornea about 1 mm. broad that seemed comparatively clear, containing but little opacity. The surfaces of both corneas were intact, there being no staining with fluorescein, but the opacities were so dense that it was impossible to detect the pupils, or the pupillary portions of the irides, so that the condition of the latter was unknown. The superficial portion of the corneas seemed to be fairly normal, but well down in the corneal stroma and towards the posterior surface the opacities became very dense and stippled in appearance.

There were absolutely no external inflammatory symptoms. The eyes externally were entirely normal except for the corneal condition.

The blood Wassermann tests of the infant itself and of the father and mother were negative. There was no evidence of tuberculosis in the family, and there were other healthy children.

Under local treatment with heat and dionin, and subsequently the use of massage with yellow oxide of mercury, the corneas cleared somewhat, the central portions clearing first, so that dim outlines of the pupils could be detected.

At this time, about six weeks after the patient came under observation, the family moved to another section of the country so that the patient passed from observation.

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#### RUPTURE OF THE EYEBALL FROM GLAUCOMA

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Rupture of the eyeball from trauma is common enough but rupture from glaucoma has not been reported very frequently. It is hard to understand why these patients did not insist on being relieved of the intolerable pain before the tension became sufficient to burst asunder the strong fibers of the scleral coat.

**Case 1.**—H. B. a healthy boy thirteen years of age with zonular cataract in both eyes was under my care in 1911 and 1912. I performed a discission twice on the right eye with good result. In January, 1912, I performed a discission on the left eye. Five days later I allowed him to go home, 80 miles away, the eye being perfectly quiet.

A few hours after he had left the hospital his physician telephoned me that the boy was suffering with pain in the left eye and I asked him to send the boy back to the hospital. This was not done and I did not see him again until four months later at which time I found that the left eyeball had ruptured through the sclera and was considerably shrunken.

**Case 2.**—In 1908 Mrs. J. L., sixty years of age, came to see me complaining of poor vision in the right eye. This eye was found to have vision of finger movements only, due to chronic glaucoma. There was no pain. The left eye had 6/9 vision and normal tension.

Seven years later she returned on account of failing vision in the left eye which was found to have subacute glaucoma. I did an Elliot trephine operation on it in January, 1915, which has given her good vision up to the present time, sixteen years. The right eye was found to have ruptured following an attack of severe pain about 1910.

**Case 3.**—J. M., aged forty-eight years, consulted me about his right eye, which was found to be glaucomatous and on which I did an Elliot trephine operation. His left eye was found to

have been ruptured following an attack of severe pain some time previously.

**Case 4.**—Mrs. W. R. when fifty-eight years of age consulted me for failing vision in her right eye. This was due to glaucoma. Vision was 6/18 after an Elliot trephine operation. This was maintained until three years ago when a cataract slowly developed. When first seen in 1922, her left eye was blind. This came on after an attack of agonizing pain in 1916. This eyeball was found to be ruptured in the equatorial region of the sclera. On July 6, 1931, she came in to see me complaining of pain in this eye. It was found to be soft and very tender with deep redness, so I performed an enucleation.

On section the eyeball was found to contain a considerable quantity of true bone in the vitreous. The rupture in the sclera passed completely around the eyeball in the equator.

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#### AMBLYOPIA IN IDENTICAL TWINS

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While congenital amblyopia and amblyopia exanopsia are to be differentiated, there must be some kinship between the causes of the primary defects in the eyes in these two conditions.

Congenital amblyopia has been considered developmental, in common with the other defects formed in utero. The following cases would lead one to believe that it is not developmental but definitely a hereditary anomaly, the result of some deficiency in the ovum or sperm.

Misses P. T. and A. T. are identical twins, sixteen years old, so alike in every respect that they cannot be distinguished unless seen together. Both came for glasses and possible improvement in vision of the left eye.

Miss P. T. had had a divergent strabismus since the age of six years. She had worn glasses for eight years which had improved the strabismus slightly. Examination showed a 20 degree divergence of the left eye. Vision O.D.,

6/9-1; O.S., 1/60. Both globes appeared small, with bluish sclerotics and discs oval at 90 degrees. Aside from this the examination was negative. Refraction with atropine and homatropine showed the following result: O.D., +1.25D.sph. = +.75cyl.ax.90°, vision 6/6; O.S., +3.25D.sph. = +2.75cyl.ax.75°, vision 6/60. With O.D. she could read the finest reading type; with O.S. she could barely see the largest reading type, a letter at a time.

Miss A. T., the sister, had worn glasses for six years. The mother stated that the eyes had never turned in or out but that the girl could never see well with the left eye. Vision O.D., 6/6-2; O.S., 6/21. There was esophoria under cover; 10 degrees for near and far with Maddox rod. She was unable to fuse objects with a stereoscope and Krolls cards, although she could see both objects at times with effort. She also had slightly bluish sclerotics and the discs were oval at 90 degrees. Refraction under atropine and homatropine was as follows: O.D., +1.25D.sph. = +.75cyl. ax.90°, vision 6/6; O.S., +3.25 D.sph. = +.25cyl.ax.90°, vision 6/15 +3. With O.D. she read the finest reading type; with O.S. only the three largest lines.

It should be noted that the refraction in the right eye of both cases was identical and the sphere in the left was the same. Bluish sclerotics were present in both as well as the 90 degree oval appearance of the discs.

Identical twins are from the same ovum, it is therefore extremely unlikely that these twins should both suffer the same developmental defect in the same eye, but rather there should have been some hereditary defect, from either the ovum or sperm cell as the primary cause.

The father is dead. He had never worn glasses, and as he was a railroad engineer, it is unlikely that he had any eye defect. The mother is myopic, wearing a —3.00D.sph. each eye, with 6/6 vision.

It would seem therefore that congenital amblyopia is not a developmental but a hereditary defect, and in this instance probably from the mother.

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# SOCIETY PROCEEDINGS

Edited by H. ROMMEL HILDRETH

## INTERNATIONAL SOCIETY MEETINGS

Two international meetings of importance were held in Paris on November 13 and 14. On the fifteenth, the Ophthalmological Society of Paris held its annual session. These meetings were held on consecutive days so that foreign visitors might have an opportunity of attending each of the gatherings.

The first, that of the International Organization of the Campaign against Trachoma, was presided over by Prof. de Grósz of Budapest.

Among those present were: de Grósz, Hungary, President; Wibaut, Netherlands, Secretary General; de Lapersonne, France; Marquez, Spain; Morax, France; Park Lewis, U.S.A.; Zachert, Poland; Van der Hoeve, Holland; MacCallan, Great Britain; Brandes, Belgium; Angelucci, Italy; Maggiore, Italy; Pantaleoni, League of Nations; Humbert, League of Red Cross Societies.

The chairman addressed a speech of welcome to the delegates and the secretary general gave an account of last year's activities. The financial accounts show that the organization having no permanent secretariat, has spent only about 300 Dutch Florins, or \$120. A sum of approximately 800 Dutch Florins, or \$320, remains available for next year's budget. Steps have been provisionally taken to obtain subsidies from the various governments. The executive committee decided to keep up the interest of the governments by official notifications of its activities, but to suspend for the time being the attempts to secure direct subsidies until the end of the present economic depression. The secretary general has begun to collect a certain number of documents on trachoma and arrangements will be made with the public library in Amsterdam for the administration and classification of this material.

At last year's meeting it was decided

to undertake two inquiries: the first on the microbiological etiology of trachoma, and the second on the significance for trachoma of the general constitution. At this year's meeting the executive committee nominated three to report on the first question.

The following were elected: Morax, France; Thygeson, U.S.A.; Pittaluga, Spain; and to report on the second subject; Angelucci, Italy; and MacCallan, Great Britain.

These reports will be presented at the general assembly of the International Organization of the Campaign against Trachoma in 1933 at Madrid on the occasion of the next International Ophthalmological Congress.

The general assembly of the International Association for the Prevention of Blindness was held in Paris, 2 Avenue Velasquez, on Saturday, November 14, 1931, at 2:00 P.M., under the chairmanship of Prof. de Lapersonne. The numerous personalities attending this meeting included: Mlle. de Teincey representing H. R. H. the Duchess de Vendome; M. Levesque, representing the Minister of Health; M. Pigot, representing the Direction of Public Health; Military Intendant Bouscasse, representing General Pau, chairman of the French Red Cross; Countess de Galard and Madame Barbier-Hugo, Presidents of two branches of the French Red Cross; Dr. Pantaleoni, representing the League of Nations; Dr. Park Lewis, Vice-president of the International Association and of the National Society for the Prevention of Blindness, representing the United States; Prof. Van Duyse (Belgium); Dr. MacCallan (Great Britain); Dr. and Mrs. Cridland (Great Britain); Prof. van der Hoeve (Netherlands); Prof. Angelucci and Prof. Maggiore (Italy); Dr. Marquez (Spain); Dr. Zachert (Poland); Dr. Lossauarn, chairman of the Chinese League for the Prevention of Blindness; and Dr. Parry (Switzerland).

Prof. de Lapersonne outlined the work accomplished by the Association during the past year, laying particular emphasis on the formation of national committees in the Argentine, Belgium, Brazil, France, Germany, Hungary, Italy, Mexico, Poland, Portugal, and Spain. He pointed out that the composition of these committees should be as representative as possible, the object of the Association being to reach all classes of the community. He reminded his audience of the great work done in America and Great Britain as regards sight-saving classes, for the education of children with defective eyesight; thanks to specialized methods of teaching, these children are given a chance of becoming normal members of the community. Dr. Humbert, secretary general of the Association had brought the subject before the Child Welfare Committee of the League of Nations. Hundreds of Paris school children had been examined for ocular defects. The Association's Secretariat had acquired, for demonstration purposes, samples of the special material used in these classes. It was expected that a sight-saving class would soon be started in Paris.

In the absence of representatives from Germany and Argentine, Dr. A. Churchill, associate secretary general, mentioned the formation of National Committees in these two countries.

Prof. van Duyse (Belgium); Dr. Cridland (Great Britain); Dr. Coutela (France); Prof. Maggiore (Italy); Dr. Marquez (Spain); Prof. de Grósz (Hungary); Dr. Zachert (Poland), spoke on behalf of the newly constituted National Committees.

Dr. Humbert, secretary general of the Association, read a report on administrative matters during the last year. On behalf of the Association he expressed his gratitude to those who had helped to promote its work and ideals; he mentioned especially the French Ministry of Public Health, the General Insurance Committee and particularly the National Society for the Prevention of Blindness whose powerful and unfailing support had enabled the Association to make good progress.

He was glad to say that at the end of the fiscal year 1931 assets were almost three times as large as at the beginning of the year.

Dr. Humbert joined Prof. de Lapersonne in expressing his warmest thanks to Dr. Park Lewis who had come over from America on purpose to attend the Association's annual meeting; they begged him to convey the expression of their gratitude to the National Society.

Dr. Humbert added that the Association would be in a position to organize in 1932 its secretariat on an independent and autonomous basis, a step which would help to widen its sphere of influence.

Dr. Coutela, secretary general of the French committee, submitted a report on "Present legislation and prophylaxis of industrial eye-accidents". He observed that this was a most important and up-to-date item in the Association's activities.

Any person suffering from an industrial accident receives, while unfit for work, an indemnity; in France and most other countries this indemnity is equal to half the workman's salary, but it is only due if work is interrupted for more than four days.

In other cases—known as minor injuries—the sufferer receives no indemnity. As approximately 80 percent of wounds of the eye come within the category of minor injuries the great majority of eye accidents consequently do not entitle the sufferer to any indemnity for cessation of work.

The result is that workmen with eye injuries, knowing they get no indemnity for such minor trouble, think twice before interrupting their work; the consequences of delayed or incompetent treatment are too often disastrous. The temporary disablement is prolonged and may even be followed by permanent disability. Among the possible remedies to such a condition of affairs, the speaker suggested the awarding of a premium for immediate treatment to the workman who had his eyes attended to at once. He observed that eye-injuries were different from all other industrial hazards and that it was

necessary either to provide for special legislation or for a modification of existing Acts with regard to this category of accidents.

M. Max Hermant, of the general insurance committee, seconded the speaker's conclusions and a resolution to this effect was unanimously adopted by the Assembly.

Dr. Cridland (Great Britain) then read a report on "The value of a complete investigation of the causes of blindness as a first step in prevention", and suggested that, before undertaking a propaganda campaign, better knowledge be obtained of the most frequent causes of blindness; he advocated uniform statistics on the causes of blindness in the different countries. This proposition was accepted after a speech to the same effect by Dr. Marquez (Spain).

Finally, Dr. Park Lewis (United States), vice-president of the Association, gave an address with cinematographic projections on "Certain rare forms of cataract of a parasitic nature observed in fish". He reminded his audience that at a conference in the city of Washington, recently, a report was read by a representative of the Department of Public Health in which he described the infestation of the native Indians by a filarial worm. An entire village of over seven hundred people as the result of this infestation had become to a greater or less degree blind. The infestations were due to the transmission of the larvae from one to another by means of one of several varieties of gnats. An invasion of a parasite involving the eyes of such a large number of people had again called attention to the importance of parasites in relation to the eyes and while the subject of the present brief paper had no connection with the filarial worm, the existence of other parasites in the eyes of living creatures, to such an extent as to make the lens almost the normal habitat of a certain variety of flukes, could not fail to be of interest to ophthalmologists.

The speaker pointed out how these observations were a further inducement to extensive research in the treat-

ment of cataract in human beings, an activity which came within the scope of blindness prevention.

In the course of the meeting the General Assembly unanimously re-elected its Executive Committee, and Staff, the latter being constituted as follows: President, Prof. de Lapersonne (France); Vice-President, Dr. Park Lewis (United States); Secretary General, Dr. F. Humbert (Switzerland); Treasurer General, M. R. Demachy; Correspondent for the United States, L. H. Carris; Associate Secretary General, Dr. A. Churchill.

On the fifteenth of November the Ophthalmological Society of Paris was convened in the Hall of the Surgical Society at 12 rue de Seine. It was presided over by Dr. Onfrat, Dr. Bailliart being Secretary General.

An interesting paper was read by Prof. Marquez of Madrid on "Combination of cylinders and skiascopy with cylinders". Dr. Polack read a paper on "Simultaneous examination of several Daltonists by means of color tests." Dr. Levi read a paper on "endocrine glands and their pathology and its bearing on ocular therapeutics".

After luncheon the afternoon was occupied by an exhaustive report by Dr. Cerise and Dr. Thirel on "Pathological anesthesia of the cornea".

More than two hundred ophthalmologists were present.

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#### MEMPHIS SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

October 13, 1931

DR. J. H. LIPSEY presiding

#### Eczematous keratitis

Dr. R. O. Rychener presented Mr. J. M. F., aged seventy-one years, under treatment for four months for conjunctivitis and recurrent minute ulcers of the cornea. In 1918 he had suffered an attack of general eczema lasting nine months. His ocular condition resembled a local manifestation of this disease and responded best to daily insufflations of powdered calomel. Allergic tests had found him sensitive to feathers, animal

emanations, house dust, pollens and certain foods and withdrawal of these with other treatment for desensitization had produced a remarkable improvement in the condition.

#### Fluid vitreous

Dr. R. O. Rychener presented Mr. R. B., aged forty-eight years, who had a cataract operation on the left eye in St. Louis, December, 1930, and was advised then never to permit any further surgery on either eye because of fluid vitreous. The vision in each eye was 1/200 and the right presented a nearly mature cataract with a membranous cataract in the left. The tension and light projection were normal.

With a knife needle a V-shaped capsulotomy was done on the left eye without loss of chamber and subsequent vision in this eye with +9.D.sph. was 6/20, with a normal fundus easily seen.

The right eye was prepared for ordinary cataract extraction with corneal suture. On completion of the corneal section the ball partially collapsed due to the escape of a large amount of vitreous as fluid as aqueous and the lens dislocated downward into the vitreous. Iridectomy was completed and unsuccessful attempts were made to grasp the lens resulting in rupture of the capsule. The wound was then closed allowing the lens to come forward in natural position whence it was extracted with a loop. Two days later the wound was closed, chamber deep and the eye proceeded to make a satisfactory convalescence. The posterior capsule still remained and will need capsulotomy later.

#### Glaucoma

Dr. E. C. Ellett exhibited three cases of glaucoma, two postoperative, for relief of tension, and one following cataract extraction.

1. Mrs. A. W. N., aged sixty-seven years, had been under treatment with miotics elsewhere for a period of four and one-half years during which there was an increasing loss of vision and field, reduced to light perception in O.D. and 5/15 in O.S., with tension 60 and 37 (Schiötz). A week following corneoscleral trephining with complete iridec-

tomy O.D. and peripheral iridectomy O.S., the tension was reduced to 22 and 18 (Schiötz). An incidental complication was the inability to dilate the pupil postoperatively although synechia were not present.

2. Mrs. S. M., aged fifty-eight years, had a microphthalmos of the right eye which had always diverged, with failing vision of the left. The vision was movements in O.D. and 6/20 O.S., with tension of 52 and 32 (Schiötz). A corneoscleral trephining with peripheral iridectomy was completed in O.S. and two weeks later the tension was 18.

3. Mrs. N. F., aged fifty-four years, had lost the right eye and vision was reduced to light perception in the left in spite of a corneal trephining done elsewhere with satisfactory relief of tension. This now measured O.D., 70 and O.S., 22 (Schiötz). Mature cataract obscured the left fundus and projection of light was faulty. A cataract extraction with corneal suture was satisfactorily executed, and a +12.D.sph. gave 6/30 vision. The disc was found to be totally cupped and atrophic, but the vision obtained was as good as that previous to her trephining operation.

#### Optic neuritis associated with sinusitis

Dr. Louis Levy reported a case of left optic neuritis, of toxic origin from an acute posterior ethmoiditis and sphenoiditis. R. W., white, female, aged fifteen years, referred from the outpatient eye department to the ear, nose, and throat department of the Memphis Eye, Ear, Nose, and Throat Hospital on August 1, 1931.

Report from eye department was as follows: "Complaining of rapidly failing vision in left eye. One week previously she had noticed a film over left eye with rapid diminution in vision. At the time of examination, vision was reduced to light perception. Externally, the eye appeared essentially normal with the exception of dilatation of pupil. Ophthalmoscopically, there was swelling of the nerve head, estimated at three diopters. Veins congested and blurring of disc edges. Right eye normal."

Upon examination in the ear, nose, and throat department, her history for

trouble about ear, nose, and throat was negative, except that she had had a severe cold two months previously. Examination of nose showed a moderately high septal deflection to the left with slight hypertrophy of the middle turbinates. There was no discharge in nares or on the posterior pharyngeal wall. X-ray examination of skull and sinuses, made at the Memphis General Hospital, reported negative. Ears and throat negative. Laboratory report of blood examination showed a negative Kahn, normal red count, normal white and differential count. Barany test showed marked stimulation of nystagmus upon turning and produced vomiting of projectile type.

Patient was referred to Dr. Eustace Semmes for examination regarding intracranial pressure. On August 12, a spinal puncture was done, spinal fluid returning clear under normal pressure. Kahn negative.

On August 15, the sinuses were again x-rayed, at which time a report disclosed cloudy left posterior ethmoids and sphenoid with some blurring of left antrum. Washing out of left antrum showed same to be free of pus. Patient was put in hospital and middle turbinate on left side resected for better drainage. Vision, however, had already started improving under ordinary shrinkage treatment. On August 18, pus was found exuding from between middle turbinate and septum on left side and with the usual treatment of suction and nasal shrinkage, nasal pus disappeared in a very short time. Vision continued to improve and on October 10, 1931, vision was 20/30.

#### Ocular and nasal diphtheria

Dr. James B. Stanford reported such a case in a child four years old. The child was first seen on October 9, with a history of having had red and crusty lids all her life and an acute inflammation of the left eye for three days. The nose was seen to be discharging and the mother stated that this condition appeared simultaneously with the acute inflammation in the eye. The conjunctiva of the left lower lid exhibited a

definite membrane and some mucopurulent material. The nose had the crusty appearance so often seen in nasal diphtheria.

Smears from the eye were negative except for pus cells. Smears from the nose showed many short chains of streptococci and a few unidentified bacilli. Cultures from the eye and from the nose showed both diphtheria bacilli and hemolytic streptococci. The child was given a half percent solution of zinc sulphonilate to drop into the eyes and was sent to the family physician for general treatment.

She was given 10,000 units of antitoxin and her physician reported today that her nose was well and that her eye was well yesterday, forty-eight hours after the one dose of antitoxin.

#### Congenital bilateral conjugate paralysis of lateroversion

Dr. Phil M. Lewis reported the case of a white male, thirty-five years of age who had never been able to move his eyes either to the right or the left. During the war he had been drafted into the army but it was soon determined that he could not execute the necessary maneuvers in drilling. He suffered severe headaches if he failed to wear his glasses. It had been necessary for him to wear lenses since he was ten years old. He complained of poor vision and of the inability to move his eyes. He had never noticed double vision. A brother and a sister of his mother were blind, cause unknown. None of his family had any defects in the movements of the eyes.

The patient could move his eyes straight up and down but could not move them at all in the horizontal plane either when told to look to the right or left or when told to follow a slowly moving object carried from side to side. Screening of one eye made no change. That the paralysis was not feigned was proven by Graefe's test with prisms before the eyes, no movement or jump of the eyes occurring. However, both eyes could converge, the near point of convergence being 70 mm. Vision was poor, 20/200 in each eye and improved only

to 20/100 with proper lenses. Refraction was O.D. —1.D.sph. = —3.50cyl.ax. 165°; O.S. —1.D.sph. = —3.50cyl.ax. 25°. Accommodation equaled seven diopters in each eye. Diplopia could not be elicited. Examination otherwise showed nothing abnormal.

Comment: Defects in the associated movements of the eyes are usually due to cerebral hemorrhage and embolism, sometimes to abscesses, tumors, and to meningitis. According to Uhthoff three

percent of cases of multiple sclerosis showed paralysis of conjugate movements. They might also be due to hysteria and traumatic neurosis. Congenital and hereditary cases were apparently rather rare. In this particular case the lesions probably were located high in the pons on both sides, involving the fibers connecting the sixth and the third nerve nuclei. They were undoubtedly congenital.

R. O. RYCHENER,  
Secretary.

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## GOOD LIGHT

In the evolution of the eye by the continual interaction of heredity with environment, a most important factor has been the light which the eye uses and to which it is exposed. This has been chiefly outdoor daylight; and there is no reason to suppose that it ever has been very different from what such light is today. In early geologic time the prevalence of clouds and forests may have prevented much differentiation of colors, or of accurate retinal images. But the evidence of fossils agrees with the relatively early appearance of eyes, as found in embryologic development. As pointed out by Miss Ida Mann, the optic pits are visible when the embryo is only 2.6 mm. long; and have closed, to form the primary optic vesicle, when it is 3.2 mm. in length. When the embryo is 10 mm. long (at 30 days) the lens vesicle has formed and separated from the surface ectoderm. At 6 weeks the lens fibers have filled the vesicle. By two months the embryonic nucleus

of the lens is visible, the optic nerve has replaced the optic stalk, and the retinal layers are forming. The essential elements of the eyes are present.

It seems clear that eyes have been formed at an early geologic stage, and have since that time been used and subjected to light similar to the outdoor daylight of our time. Certainly this is the light to which eyes have been accustomed through geologic ages. In the middle of a bright day, even at sea level the light may amount to 10,000 foot candles. Even in the shade of a tree at noon, or toward evening under open sky, it may be 100 foot candles. Compared with this, such illumination as the eye has used and borne, and under which it has developed, the 2 to 6, or even 20 to 50 foot candles, specified in codes for artificial lighting, seem very inadequate. The highest resolving power, the best appreciation of color, the quickest visual perception, are attained with high degrees of illumination. The best developed eyes, those of

man and of common birds, are fitted for seeing by strong light.

Anyone interested in photography, soon learns the enormous differences between the exposure required in bright daylight, and that required by moonlight, or indoors, even in well lighted rooms, or interiors with the ordinary artificial light provided for their use at night. The camera gives a quantitative comparison, that shows the light our eyes are suited for is 50 to 1,000 times brighter than the light by which we often use them. Unless the eye is turned toward the light source, the light is practically never too bright. A good light is first a bright light, and generally it would be better if brighter.

Even strong daylight is too much excluded from the interiors, in which most delicate and important eye-work is done. The most striking characteristic of the normal eye is its capacity of adaptation, to see by light of different degrees of brightness. This varies from vision by strong sunlight to useful vision with light that has only 1/1000 as much power of affecting the photographic film. Adaptation is possessed by every part of the functioning retina. But it is largely influenced by the functional state of adjoining parts of the retina. Contrast, by which things are recognized, is most serviceable when bearing a certain optimum relation to the different degrees of brightness, exposed in other parts of the field of vision.

The disagreeable sensation of "glare" is familiar to all of us. But glare is only the affect on the retina of light that does not help us see what is looked at. Excessive light when the retina is dark adapted is glare; or generally light of greater brightness from things we do not wish to see, than from the thing on which attention is fixed. Good light must be as bright, or brighter, on the thing looked at, than in the periphery of the field. Macular vision demands slightly more light than peripheral vision. Light cannot be considered good apart from the background and surroundings, that enter into the visual field.

Variable light always catches our vi-

sion at a disadvantage. When it gets brighter the retina is a little dark adapted. When it gets dimmer the retina has become a little more light adapted. Good light is always steady. In this respect daylight is generally perfect; and artificial lighting has greatly improved by giving up flames, and the introduction of the incandescent mantles, or filaments. The arc light is imperfect, but is rapidly being superseded by more steady sources. The slow transition of dawn and twilight; and the gradual increase of daylight from sunrise to noon, and its gradual decrease to sunset perfectly suit the eye, although they interfere with photography. Where bright and dark objects must be present in the field, the general illumination must be carefully proportioned; especially if the gaze must be turned from one thing to another.

Color of light has been discussed since artificial lighting became so important, and is worthy of some attention. White daylight best meets all the common needs of vision; and artificial lighting may well be planned to approach this standard. But artificial white light, obtained by screening out some colors, gives a light of reduced intensity; and diminished brightness is often worse than undesirable color. Fortunately most electric lights give an excess of yellow, or red light. The yellow part of the spectrum is a brilliant part, and red light is more penetrating. Then red light is something that the retina is accustomed to, because of its constant penetration in large amount through the lids and sclera. Monochromatic light, of any color, is generally inferior to white light. For special uses the production of lights of special colors; and the blending of lights from different lamps to produce white light, may properly claim the attention of illuminating engineers, although white light thus formed may differ essentially from sunlight.

Light, from whatever source, will not prove good unless appropriately placed. Light from sun and sky comes from above; and the eye, placed to utilize and protect itself from light coming in that direction, can always make the best

use of such light. Artificial light in general must come from above and generally, like the daylight, be diffused. Light reflected from a nearly white ceiling gives the best general lighting of a room. But for artificial light we must remember that the intensity decreases as the square of the distance increases. A light giving 100 foot candles, if placed 5 feet above the work seen by it, gives only 4 foot candles. Even 5 such lamps give only 20 foot candles. If placed close to the work the lamp must be shaded from the eyes; best by a reflector that will concentrate it on the work.

Diffuse light softens or overcomes shadows. This is best for the original illumination of rooms and for most kinds of work. But for some things shadows help. For sewing with thread and stuff of the same color, the shadow side of the thread makes it more distinctly visible. The ophthalmologist needs to have all these things in mind. Sometimes explaining them to the patient is the greatest service he can render. A woman with partial cataract may be greatly helped by always having the strongest light on her work, and none on her eye.

Edward Jackson.

### WILLS HOSPITAL

So closely interwoven are all the affairs of life and of human society that we cannot proceed far in the study of any important department of activity without finding it necessary to broaden our inquiry so as to include other fields of knowledge or enterprise. Thus, the remarkable self-made naturalist Audubon (self-made if ever such a title can rightly be applied) would have shone with a greatly diminished glory but for the fact that in studying nature he made himself incidentally a master of the art of painting in oils.

Through its personal, scientific, and social relationships, the history of any great institution, broadly regarded, is an epitome of the history of the community in which it has conducted its affairs. Its management and purposes are likely to reflect in some degree the religious atmosphere, the political and

social developments, the standards of living, and above all the professional ideals of successive epochs.

The traditions of the city of Philadelphia, since its founding in 1681, have been among the best in the United States, in spite of political scandals and rapidly changing population. In its early life it acknowledged chiefly the leadership of the Society of Friends. Its citizens, like those of Boston, have been accused of being "excessively preoccupied with their ancestors". The Friends did not long maintain a numerical ascendancy, and indeed facetious Elizabeth Robins Pennell has remarked that in the later days, outside the Society of Friends, the prevailing idea of William or "Billy" Penn "was that his chief greatness consisted in the cleverness with which he fooled the land out of the Indians for a handful of beads". For a long time, nevertheless, it remained true that to the Friends all the aristocracy of the traditional kind belonged. Joseph Pennell the artist, husband of facetious Elizabeth Robins, was himself both a Philadelphian and a Friend, and he executed many beautiful lithographic drawings of the Quaker city.

The modern American worships antiquity the more because he has, compared with his European cousins, so relatively little of it; and in this respect, as well as in "preoccupation with his ancestors", he suffers perhaps from a somewhat undignified inferiority complex. Yet Philadelphia, with a history that includes William Penn, Benjamin Franklin, Independence Hall, and a city plan contemporaneous with the reign of James the Second of England, has its full share of the dignity that comes from age and tradition.

The establishment of hospitals limited to the special sensory organs is a matter of recent history. Moorfields eye hospital, London, long famous in the development and teaching of ophthalmology, was only founded in 1805. For centuries there had been "specialists" in the eye, not always in particularly good odor with the regular medical profession; but the frank recognition of ophthalmology as a separate specialty belongs to the nineteenth century.

Of short life was the first institution in the United States exclusively devoted to ocular surgery, that founded by Elisha North at New London in 1817. The Eye and Ear Infirmary of New York was founded in 1820, and the Massachusetts Eye and Ear Infirmary in 1824. George McClellan, Sr., then just graduated from the University of Pennsylvania, attempted in 1821 to create a "hospital" for treatment of diseases of the eye in Philadelphia. This institution, essentially a private enterprise, seems to have abdicated in 1825 in favor of the Pennsylvania Infirmary for Diseases of the Eye, which flourished in a second story room at a rental of one hundred dollars a year, although its staff included such distinguished persons as Isaac Hays and Philip S. Physick.

Notwithstanding the slightly junior position of Wills Hospital among America's special institutions, venerable Guy's Hospital of London, England, is only a little more than twice as old as Wills, and the money with which the latter was founded came to its possessor in a way much more in keeping with the atmosphere of philanthropy, for Guy amassed his fortune from unscrupulous speculations in shady enterprises, while the dollars to which Wills Hospital owes its existence were accumulated in the business of selling groceries.

The Wills family were of the Society of Friends. James Wills, Jr., son of the successful grocer, died only a few years after his father, and left \$108,000 to the mayor and corporation of the City of Philadelphia for establishment of "The Wills Hospital for the relief of the indigent blind and lame". By the time the building could be started (the will having been disputed), the amount available had increased to \$122,000. The Hospital was ready for use in 1834, during the second term of office of President Andrew Jackson. Philadelphia then had a population of about 150,000.

In spite of the important parts which have been and are being played by other institutions, Posey and Brown are probably justified in assuming that Wills Hospital, by direct and indirect teaching, has led the country as a school for

ophthalmologists. Shortly it will celebrate its one hundredth anniversary. And now a great change is under way. Already the march of civic improvement has altered beyond recognition old Logan Square (upon which the hospital abutted), one of William Penn's four original "breathing spaces for the city", and which the "blind and semi blind with their black patches and their dark glasses . . . in the past utilized . . . as a waiting room for Wills Hospital".

The original building accommodated about seventy patients and their attendants. Although important additions had been made from time to time, the old structure had long been regarded as inadequate, as to both amount and quality of the space available. The great Parkway between City Hall and Fairmount Park had greatly added to the value of the old site. In June, 1930, the Board of Directors of City Trusts sold the entire property to Mr. Cyrus H. K. Curtis for the handsome sum of \$1,100,000, to be used for a building devoted to musical education and recreation; and in March, 1931, the Board acquired ground for a new hospital building on Sixteenth and Spring Garden streets (close to Broad street). The new building, of Georgia-Colonial architecture, in red brick and limestone, will cover an area 157 by 157 feet, and will have six full stories in addition to a basement and roof quarters for the superintendent. The ultimate bed capacity, without overcrowding, will be for 250 patients; and there will be provision for thirty nurses, seven resident physicians, and associated clinics.

This momentous broadening of the scope of the old institution is fitly celebrated by the appearance of an artistic volume entitled "The Wills Hospital of Philadelphia, the influence of European and British ophthalmology upon it, and the part it played in the last 100 years in developing ophthalmology in America"; sponsored as to authorship by William Campbell Posey, consulting surgeon of the hospital, and Samuel Horton Brown, Fellow of the College of Physicians, and as to publication by J. B. Lippincott Company and "the City of Philadelphia trustee under the will

of James Wills, deceased".\* In that volume are to be found, in addition to the records of the hospital itself, portraits and biographies of the distinguished ophthalmologists who have labored within its walls, and who in many instances have transplanted to other educational and clinical centers the fine training and traditions of the Philadelphia institution. May Wills Hospital continue, not only for its immediate community, but for the North American continent and even for the whole civilized world, to thrive greatly in the development of ophthalmologic service and education!

*W. H. Crisp.*

### PICTURES OF THE OCULAR FUNDUS

By the death of the ophthalmic artist, Mr. A. W. Head, of London, his widow has been left his original drawings of the fundus of the eyes of mammals and reptiles. These number 206; and a reasonable valuation of them has been placed at one thousand pounds. As there are many different specimens of the same natural order, and sometimes from the same species, it seemed that they would be more useful, if not kept in a single collection. With the help of Miss Ida Mann, the collection has been divided into six groups, each of which contains representatives of the important natural orders, about 40 of the drawings. The disposal of these sets will be made by Theodore Hamblin, Ltd., of London.

The opportunity might well claim the attention of several of the American universities, that maintain strong departments of ophthalmology. The original pictures were made to illustrate the *Atlas of Fundus Oculi in Animals*, edited by Lindsay Johnson. Of this only a limited edition was published; and, for many years, it has been difficult or impossible to obtain a copy. The skill of Mr. Head, in depicting the fundus, will be appreciated by everyone who has examined the fundus oculi of birds, since published by Dr. Casey A. Wood.

*Edward Jackson.*

\* Further details regarding this volume will be found under "Book Notices" on page 153 of this issue.

### PEDIATRICIANS AND OCULISTS

It cannot be denied that the earlier a child begins to wear a correction for a high error of refraction, particularly astigmatism, the better the ultimate visual result will be. Many children with marked errors of refraction, especially when unilateral, are not seen by an oculist until the subnormal vision is detected by the visual acuity tests given in the schools. It would be an advantage to the child to have glasses earlier, while macular vision is still developing its maximum efficiency.

As many children today are under the care of pediatricians from infancy to above school age, and report to them periodically for examination, there is no reason why, if the pediatrician is supplied with the proper charts, he cannot test the child's visual acuity at the age of four years or less. With the test chart of pictures designed by Green and Ewing, it is a simple matter to teach a four year old child the figures, and obtain an intelligent measure of its visual acuity with very little expenditure of time and effort.

It is the duty of the oculist to bring to the attention of the pediatricians in his community the necessity for the detection of such visual errors early in a child's life. Routine testing of school children's vision has prevented much ocular disability by the early discovery of ocular defects, but with the cooperation of pediatricians, we can and should go one step further by detecting the more gross errors in children of preschool age.

*M. F. Weymann.*

### REFRACTION FOR THOSE OF AVERAGE MEANS

It is the obligation of the eye physician to care for members of all classes and because the average wage earners comprise by far the largest group it is especially necessary that these men and women and their children shall be served by him. The poor in the larger cities or within reach of them can consult ophthalmologists in clinics and the wealthy can get the best, but it is less certain that adequate medical ophthalmic service is financially possible for the

group between and so those of this group often seek a compromise between the best and the worst.

Undoubtedly there are many factors which influence the choice between ophthalmologist and optometrist but the most urgent one is economic and it is this which frequently decides the matter. In most places the patient can have his eyes tested by an optometrist and can purchase glasses through him at considerably less original cost than if he consults an oculist and is referred by him to an optician to have the prescription filled. Not only is there the additional doctor's fee but in some cases a higher charge for lenses and frames than does the refracting optician or optometrist.

Another handicap for the ophthalmologist is that in many communities he does not have a united medical profession behind him; a profession that universally urges the patient to consult none but an eye physician for the measurement of his refraction.

Admittedly, we find a multiplicity of ideas among ophthalmologists about this subject of refraction. If practice is satisfactory it is only human to believe that "All's well with the world," whatever abstract opinion may be held. The ophthalmic leaders are necessarily in this situation and therefore most of them do not feel a vital urge to study this problem in order to arrive at some general conclusion.

The majority of oculists believe that the refraction of these people is a part of their professional obligation and privilege. Fundamentally the question of reaching them reduces itself to the ability of the patient to pay. The average worker earns between fifteen hundred and two thousand dollars a year; that is about a hundred and fifty dollars a month, out of which to support himself and his family. Can he afford to pay an ophthalmologist for himself and perhaps others of his family, ten to twenty dollars for his examination and an optician, ten to twenty dollars additional for each pair of glasses needed? Unquestionably the oculist who makes a painstaking ophthalmoscopic examination, a retinoscopy, a slitlamp examina-

tion, perhaps a visual field or other special test, plus a careful refraction, cannot afford to do this for the same charge that an optometrist, who omits all but the refraction, can afford to do. There is not the slightest doubt that the highest type of service by ophthalmologist and optician is worth fully this and more but the question is not one of worth but of ability to pay.

It is obviously true that there is no comparison between the work of ophthalmologist and optometrist and in the long run poor refraction even if cheap at first cost will prove painfully expensive but it is a pity that the patient must learn this by bitter experience.

It is less costly to pay an ophthalmologist for accurate refraction once, than an optometrist half a dozen times for incorrect lenses. Unfortunately, it is easier to pay a large amount in small allotments—witness the extent of instalment buying—than half the amount in one lump sum and the patient of necessity chooses what on the surface appears to be the most economical course.

If the oculist desires to continue to serve these people of the middle wage class he must face the facts as they exist and make his charge to them in proportion to their means. Furthermore, he has a right to expect the optician to fill the prescription for less than if the optician were bearing the burden of performing the refraction himself. In this way the difference in the cost to the patient of consulting a physician as compared with an optometrist would not be so great as to present the obstacle that it now often does.

The fear of any unavoidable financial burden on his patient is one of the most important reasons for the occasional failure of the family doctor to refer the patient to an ophthalmologist. The physician may prefer the services of an ophthalmologist but he is constantly and painfully aware of the pecuniary difficulties of his patients and he wishes to protect their pocketbooks. Other things being equal the family physician would not hesitate between ophthalmologist and optometrist.

The idea of close cooperation between ophthalmologist and optician is ethical

and desirable for all concerned and may be essential, if the ophthalmologist is to continue to perform refraction for the average wage earner. The patient considers the cost of his glasses as the sum total that he pays to physician and optician and this must be within his means. The ophthalmologist must be educated to do better refraction and make himself more valuable to the community, he must convince his medical confrères and the laity of his value and he must seek the closest possible cooperation with the optician for the good of the patient and not for his personal gain.

*Lawrence T. Post.*

#### BOOK NOTICES

**The Wills Hospital of Philadelphia,** the influence of European and British Ophthalmology upon it, and the part it played in the last 100 years in developing ophthalmology in America. By William Campbell Posey, consulting surgeon to the hospital, and Samuel Horton Brown, Fellow of the College of Physicians. 340 pages illustrated. Bound, price \$5.00. J. B. Lippincott Company, Philadelphia, 1931.

Wills Hospital has nearly reached its one hundredth birthday. It is also leaving the old home with which so many American and foreign ophthalmologists are familiar, and is being reestablished in newer and much ampler quarters. It is therefore appropriate that two of the most distinguished representatives of the profession of medicine in Philadelphia have produced this striking volume.

In the main the history by Posey and Brown succeeds in being a work of literary art and historical perspective. It touches adequately upon the development, in the United States especially, but also in Europe, of the profession of ophthalmology as a distinct branch of the medical art.

Moorfields Hospital, London, established in 1805, is given particular credit for the early ophthalmologic training of those American surgeons of general or limited practice who were conspicu-

ous in our specialty. A complete chapter is devoted to "general surgeons in ophthalmology", while the next chapter, dealing with "the development of ophthalmology as a specialty" and "the birth of modern ophthalmology", summarizes the creative work of Helmholtz, Graefe, and Donders, and shows how the continental rather than the English centers then became Meccas for the ambitious American surgeon.

In the respective chapters are given a large number of brief biographies of those who were associated with Wills Hospital, either as general surgeons skillful in eye surgery, or, in the later days, as ophthalmologists in the strictly limited sense. In addition to forty-two portraits of ophthalmic surgeons and others, there are a number of interesting illustrations of details of Wills Hospital itself, and of instruments designed by prominent surgeons who were connected with the hospital.

The authors have ventured into discussion and records with regard to a number of matters of ophthalmologic history, including the changes which have occurred in the surgery of cataract and glaucoma, the development of modern refractive technique and experience, the literature of ophthalmology, Philadelphia medical publishers, societies for the prevention of blindness, and associated clinics at the hospital such as those for the care of ear, nose, and throat, and of syphilis in relation to the eye.

Of such a labor of love it seems perhaps ungracious to utter even minor criticisms. To prepare a volume of this kind is no light undertaking. The earlier chapters are much the best. Some of the brief biographies become a trifle wearisome, and give the impression ordinarily conveyed by a series of necrologies in which the purpose is to say "nil nisi bonum" of the dear departed. Several official reports, of rather formal and routine phraseology, are reproduced in full, and impress the reader as perhaps slightly out of place in a history which otherwise carries a distinctly literary flavor. The literary quality of the work would moreover have been improved if the authors had not displayed consistently the desire to pat everybody on the

back, and if they had excluded some not altogether essential details. But satisfactory blending and compression of a mass of formal documents consume a great deal of time and labor, and it may be that "the City of Philadelphia trustee under the will of James Wills, deceased", by whom the volume is copyrighted, demanded a more formal treatment of these features of the history. The usually polished text is slightly marred by the presence of a few literary solecisms or improprieties; and there are also one or two obvious errors, as for example the statement on page 269 that the merging of the Ophthalmic Year Book with other American journals to form the American Journal of Ophthalmology occurred in 1927.

But all in all this history is a scholarly and faithful work upon which its authors are to be highly complimented, and for which they are entitled to the gratitude and respect of their professional colleagues. *W. H. Crisp.*

**Introduction to the literature of vertebrate zoology.** By Casey A. Wood, M.D., LL.D. Buckram, Quarto 664 pages. Oxford University Press, London, 1931.

Those who know Dr. Wood and his former activities will feel that this volume is a substantial answer to the question, frequently heard; "What is Dr. Wood doing?" Beside the preface of seven pages there are nineteen chapters, 150 double-column pages of text; giving a good introduction to the history of this literature. Then comes a 20-page classified and chronological index, to the authors of the literature and their writings. The bulk of the work, 468 pages, is the annotated catalogue of titles in McGill University Libraries.

The libraries included are, the Blacker Library of Zoology, the Emma Shearer Wood Library of Ornithology, the Bibliotheca Osleriana, including the Gest Library of Chinese literature; and manuscripts, and type-script letters of zoologists. Few of the books thus catalogued, like the "Fundus Oculi of Birds", of Dr. Wood, and the "Anatomy of the Mammalian Eye", of Lindsay

Johnson, will be of direct interest to ophthalmologists. But there are reprints and briefer communications, twenty by Dr. Wood, that also contribute to the value of these libraries, and of the catalogue.

The frontispiece is a fine reproduction of an original drawing of the extinct dodo; which is in the Blacker Library, and attributed to Charles Collins, about the year 1736. The existence of such a work cannot fail to be a help to future students of vertebrate zoology. This book, or something of the kind, might be studied with benefit by anyone who attempts to catalogue, or give a historical review of the literature of ophthalmology, or any other special department of medical literature.

*Edward Jackson.*

**Lehrbuch und Atlas der Spaltlampenmikroskopie des Lebenden Auges.** (Textbook and atlas of slitlamp microscopy of the living eye). By Dr. Alfred Vogt, director of the Universitäts-Augenklinik, Zurich. Part II, Lens and zonula, 455 pages, 815 illustrations, mostly colored, on 163 plates. Price 298 marks. Verlag von Julius Springer, Berlin, 1931.

A year ago Professor Vogt gave to ophthalmological science the first volume of his second edition of the textbook and atlas of slitlamp microscopy which pertained to the cornea and anterior chamber. We are again indebted to his seeming inexhaustable energy for this second volume, which describes the lens and zonula. The text comprises 455 pages. There are 163 colored plates, the quality of which again is excellent in detail of reproduction. There is the astounding number of 815 illustrations.

These illustrations again allow an appraisement of the value of the refinement in observation made possible by his method of the thin optical section. Without this an optical analysis of the normal and pathological lens and the new disclosures made by the author would have been impossible. Gullstrand, the genial inventor, expressed the opinion that he had not anticipated the great revelations in ophthalmologi-

cal diagnosis possible in this apparently homogeneous organ. The developmental connection between the lens suture system and the peripheral divergence of the zones of discontinuity which are dependent on it are clarified. Gullstrand's theory of the intracapsular changes during accommodation are fully discussed (Nobel prize dissertation, 1912). This theory, based on mathematical deductions, led Gullstrand to the positive conviction that during accommodation the lens fibers are displaced in their relationship to one another because the lens substance of itself is not elastic. An interchange of fluid through the walls of the lens fibers, or a change in their form, is impossible because of the rapidity of the accommodation process. Vogt suggests that the alteration in the shape of the lens during accommodation may be due to a change in the form of the fiber somewhat similar to that seen in striped muscles. The content of the fibers may be displaced with a more likely retention of transparency. Koellicker's conception of the morphology of the lens fiber, corroborated by modern histologists, is that the lens fiber is a tubule with fluid content. A cutting or tearing of fresh fibers discloses an extrusion of fluid from the torn ends. All of these facts seem to favor the likelihood of a change in fiber shape rather than their displacement during accommodation, as Gullstrand believed.

The evidences of senility in the eye are discussed in a special chapter. In this chapter the author quotes a dissertation he gave before the Zurich Medical Society in 1927. He compares the evidences of senility in other organs to those of the eye and emphasizes the prime influence of the germ cell on all of them. The germ cell does not alone predetermine the length of life of the whole organism, but also that of individual organs and the time of onset of their decline. The human body is therefore composed of organs and parts of organs which vary in their vitality. There are families in which such important organs as the vascular system, heart and kidneys are destined to a limited life span. In a similar manner the

pigment of the hair and the epithelium of the lens may suffer an early decline in vitality. The decline is not mechanical or chemical in the nature of a phenomenon of exhaustion or wearing out of the organ, but the type of degeneration and the time of individual onset are strictly inherited. The fact that senile cataract causes early visual disturbances does not justify a conception that it is different in character from other senile changes or the result of any specific insufficiencies. Therapeutic efforts with this in mind are destined to failure.

In the chapter pertaining to the pathological lens we find further research on some of the lens changes first described by the author. Among these are the anterior axial embryonic cataract, cataracta centralis pulverulenta and hereditary spicular cataract (Spiess-Kataract). Senile cataracts, nuclear sclerosis, cataracta complicata in all their multiple biomicroscopic varying manifestations of incipience, progression and cessation are exhaustively described and illustrated. Here the author has expanded in a field of disclosures, the magnitude and diagnostic and prognostic importance of which can best be appreciated and evaluated by the ophthalmologist already familiar with his original findings.

Newer forms of senile lens changes are described, such as the quite common anterior suture punctuation, and rare disiform cloudings within the anterior cortex. Toxic iritis with tension due to an intracapsular change of the cortex of ripe cataracts is described. The cortex undergoes a metamorphosis, changing to a clear fluid and there are white crumb-like lens particles adherent to the capsule. A new form of acute cataract following an acute glaucoma is described. Multiple subepithelial circumscribed white spots, which do not progress, are seen. Some have been observed to retrogress. Newer detailed observations on the cataract complicating myotonic dystrophy as well as superficial anterior capsular exfoliation causing glaucoma, are offered.

The chapter pertaining to traumatic cataract discloses so many new observations that a list of them would be too

lengthy for this review. The injury to the lens due to radiating energy as manifested in "fire cataract," experimental cataract produced by infrared light and the delayed influence of radium and x-ray therapy are fully elucidated.

An interesting chapter on the zonula, its anatomy, congenital anomalies and the effect of trauma, that can be seen only by the slitlamp, closes this interesting work.

Ophthalmologists maturing in this generation are to be congratulated on the contemporaneous availability of this display of advances in biomicroscopy of the eye as disclosed in word and picture by this untiring, talented author.

*Robert von der Heydt.*

**Seeing, a partnership of lighting and vision.** M. Luckiesh, D.Sc., and Frank M. Moss, E.E. Cloth, Small 8 vo., 260 pp. 26 plates and 60 figures in the text. Baltimore, Williams and Wilkins Co., 1931. (See also notice: Amer. Jour. Ophth., v. 14, no. 9, p. 970.)

These authors are electrical engineers. Luckiesh being the Director of the Nela Research Laboratory of the General Electric Company. As they point out in their preface, "Seeing depends upon light and lighting, as well as upon the eyes and the visual sense. Excellent scientific data are available pertaining to vision; but very generally light and lighting have not received much consideration as a partner of the visual sense." "It is hoped that this treatise will be helpful to psychologists, physiologists, ophthalmologists, opticians and optometrists in their research and practice; to those interested in the conservation of vision; to anyone confronted with a problem or condition involving visibility; to lighting specialists, and others concerned with efficiency and productiveness in the work-world; and to every one who would see easily, comfortably, quickly and accurately." Whether or not these hopes can be realized, it is certain that ophthalmologists may be helped, by viewing some of their familiar problems from a different point of view.

The first chapter is entitled "A Half-Seeing World", and this title is justified in this way: "With eyes perfected throughout eons of evolution under thousands of foot candles of daylight illumination, and subjected to severe visual tasks, under intensities from 1/100 to 1/1000 of the original environmental intensity, it is not surprising that they do not work at their best and that they become more and more defective." In the chapter on fatigue is pointed out how difficult it is to devise scientific tests for fatigue. The standard test used in the research laboratory is two parallel bars of black, separated by an equal space of white. The test being to tell, whether the bars are placed vertical, or horizontal. The "incomplete square" is better, because there are four directions in which it may be turned.

In the chapter on "Glare and Visibility" is given this excellent definition, of an over-used, indefinite term: "In general glare may be defined as the undesirable effect produced by light entering the eye directly from any brightness, other than that of the object to be seen."

The chapter on "Spectral Character of Light" should also help to dispel the haziness that marks much that has been written about the relations of light and color. There is also a chapter on "Footcandles" that should make our views more definite with regard to illumination. The chapter on "General Lighting, Plus" presents the need for general adequate illumination; but also the need for local illumination, to give sufficient light for certain kinds of work.

A reference list of 48 titles gives a wide access for the student of the literature of lighting and kindred subjects. A supplement describes "A Demonstration Visual Test", with which even those who have "perfect", "normal", or "standard" vision, can readily convince themselves that they see better under strong illumination, by means of the seventeen plates printed in gray that illustrate it. A large proportion of the illustrations are graphs, that show the mathematic relations between size, brightness, contrast exposure and visibility. Although this book frequently

refers to "original sources" to sustain its statements, it will prove an original source, for ophthalmologists sufficiently interested to study its subject.

*Edward Jackson.*

**Die skrofulose Augenentzündung** (Scrofulous ophthalmia). By Professor Dr. A. Siegrist. Sixty-eight pages, with eight figures in the text, and, in addition, twenty-eight color figures on fourteen plates. Stiff paper covers, price eight marks. Urban and Schwarzenberg, Berlin and Wien, 1931.

On this side of the Atlantic not very many ophthalmic surgeons would think of writing a special treatise on "scrofulous ophthalmia". Perhaps that is partly because we encounter much more rarely than does the European surgeon the type of disturbance which is designated by this title; and partly because we do not use the designation itself so comprehensively as do Professor Siegrist and his colleagues.

The purpose of the monograph is to bring together everything worth knowing for the understanding and treatment of the disease, with the help of numerous entirely realistic plates. (The plates may be had separately for use in the classroom, especially for projection upon the screen.)

Siegrist declares unjustifiable the persistent tendency for many ophthalmologists to apply the name "eczematous" or "phlyctenular" to the condition here discussed.

"It must be recognized as one of the most important diseases of the human visual organ, above all because it is the most frequent morbid affection of the child's eye, and further because, while it commonly occurs in most variable forms, often differing widely, and therefore presents diagnostic difficulties even to the experienced physician, but finally on the ground that the results of this very widespread disease, especially without treatment or after inadequate care, are not uncommonly of extraordinary severity for the whole visual organ and as a rule are too lightly

estimated by laymen and physicians alike."

The plates, excellently drawn and reproduced in colors, include phlyctenules in various locations, corneal ulcers and infiltrations, ribbon keratitis, pannus, corneal opacities, tuberculoma, and "scrofulous" skin conditions accompanying "scrofulous" eye diseases.

The scope of the author's classification is rather clearly indicated by this brief mention of his illustrations.

*W. H. Crisp.*

## CORRESPONDENCE

EDITOR, AMERICAN JOURNAL OF OPHTHALMOLOGY

DEAR SIR:

I was greatly interested in the description of the fixation device for retinoscopy described in your issue of November, 1931, by Dr. Hough. . . . A substantially similar device, with a full discussion of the principles involved was published in your issue of January, 1927, under the title "The Photoscope". The instrument first presented to your readers in 1927 was subsequently modified, improved and described at various times during the past four years in optical and ophthalmological magazines both here and abroad. The Photoscope has been made in England since 1928, by the Ellis Optical Company, Croydon, England. . . . The instrument is being made up by one of the largest manufacturers of ophthalmological instruments in this country, and will be available for distribution in the near future. . . .

Very truly yours,

Signed, Joseph I. Pascal, M.D.

EDITOR, AMERICAN JOURNAL OF OPHTHALMOLOGY

DEAR SIR:

Your letter and enclosures from Dr. Pascal were a surprise to me. I have never seen the article in question published in 1927 issue of the Journal as I was not reading it at that time. I do not know now what the photoscope is. I got the idea from two sources. First from a convex rear view mirror on my car secondly from some experiments I

have been doing with red and blue letters in detecting latent hyperopia. . . . The device I used myself is primitive and somewhat clumsy and I imagine the photoscope must be quite a different piece of apparatus. . . .

Yours very truly,  
Signed, A. G. Hough, M.D.

It is, of course, regrettable when an author presents an instrument similar to one previously described by some other person without giving credit to that person. It is, however, easy to understand how previous literary contributions may be overlooked when one considers the great volume of ophthalmic literature and the inaccessibility of much of it to most American ophthalmologists.

With the editor rests the only other possibility for the similarity of two descriptions being noted before publication but the editor does not question the originality of contributions and solely by chance would discover the coincidence. He can only express his regret at the occurrence. *Lawrence T. Post.*

#### OBITUARY

##### George Strong Derby

National and international ophthalmologists are mourning the death of George Strong Derby, which occurred on December 12, 1931, of pneumonia, after a two days' illness. He had reached the heights in his career as a progressive teaching and practicing ophthalmologist and his friends were looking forward to added notable achievements on his part.

Dr. Derby was born on May 29, 1875, the son of Dr. Hasket Derby, in whose notable professional footsteps he followed. His preliminary education was at Noble's School, after which he entered Harvard University being graduated in the class of 1896 in arts, and in 1900 in medicine. He then studied in Europe for two years following which he returned to Boston and entered into private practice.

In 1916 Dr. Derby accompanied the

Harvard Medical School Unit, later known as Base Hospital no 5, to France as ophthalmologist. This unit arrived in France on May 30, 1917, from which time until his return to the United States in January, 1919, he was one of the most important figures in the ophthalmological service in France and was well known by all of the eye physicians of the American Expeditionary Forces



GEORGE STRONG DERBY

where his professional skill, organizing ability and personal charm were conspicuously prominent. He was cited by General Pershing "for exceptionally meritorious and conspicuous services as consulting eye surgeon in the American Expeditionary Forces".

He was connected with the Massachusetts Eye and Ear Infirmary for eight years as ophthalmic clinic assistant, ophthalmic assistant surgeon, ophthalmic surgeon, and for the past seven years as ophthalmic chief of service.

To his position as Williams Professor of Ophthalmology in the Harvard University Medical School he brought the fine and forceful organization abil-

ity so well shown in his work as assistant consultant in ophthalmology with the American Expeditionary Forces. This same ability with his fine qualities as a teacher made his position of chief surgeon at the Massachusetts Eye and Ear Infirmary of untold value to that institution.

His going has left a void that only the lapse of years will begin to fill. He was a keen observer, positive in his convictions, and a pioneer in our profession. The last of his many fine papers on ophthalmological subjects, read before the recent meeting of the American Medical Association, was on "The need of medical social service in eye clinics". This paper clearly showed the value of his pioneer work in this particular field. This, and his work with ocular tuberculosis, light adaptation, glaucoma, and improved technique for cataract operations has been of great help to ophthalmic surgeons and their patients.

His long and excellent services to the Section of Ophthalmology of the American Medical Association as its secretary and later as its chairman make an enviable record which was added to by his notable services to the American Ophthalmological Society as a Council member.

He was a true and loyal friend, as his many companions will testify, an enjoyable companion with his friends in work, travel or sports, a loving, devoted

husband and father, who gave of his best to his family, and a wise counselor to his multitude of patients who will feel lost without his kindly and honest advice.

Especially was he beloved by those patients, and they were many, who realized that they owed the restoration of their lost vision to his painstaking study followed by the coolly and skillfully executed surgical procedure which his judgment dictated as necessary, as well as by those fearing blindness from glaucoma, who had that fear forever removed as a result of his early diagnosis and skillful care.

Many British soldiers will remember his personality, if not cognizant of his name, with loving gratitude for what he did for them during his long service with the British Expeditionary Forces in Flanders.

Particularly will he be missed, outside his family circle, by those young ophthalmic surgeons who were his students, followers, and assistants and by those with whom he was associated in editorial work.

He is survived by a wife and a son and daughter and also his mother, a sister, and four brothers.

A star of the first magnitude in the ophthalmological firmament has disappeared from our earthly view, but the influence of its brightness will be felt for years to come. *Allen Greenwood.*

# ABSTRACT DEPARTMENT

EDITED BY DR. WILLIAM H. CRISP

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

## CLASSIFICATION

1. General methods of diagnosis	9. Crystalline lens
2. Therapeutics and operations	10. Retina and vitreous
3. Physiologic optics, refraction, and color vision	11. Optic nerve and toxic amblyopias
4. Ocular movements	12. Visual tracts and centers
5. Conjunctiva	13. Eyeball and orbit
6. Cornea and sclera	14. Eyelids and lacrimal apparatus
7. Uveal tract, sympathetic disease, and aqueous humor	15. Tumors
8. Glaucoma and ocular tension	16. Injuries
	17. Systemic diseases and parasites
	18. Hygiene, sociology, education, and history

### 1. GENERAL METHODS OF DIAGNOSIS

Braun, Georg. **A new hemikinesimeter.** Klin. M. f. Augenh., 1931, v. 87, Oct., p. 441. (Ill.)

Braun describes and illustrates a new hemikinesimeter devised at the instance of Professor Elschnig at the latter's clinic and constructed by Zeiss, Jena. Its advantages are: equal intensity of both stimulating lights, equal angle of incidence, equal distance, constant adaptation of the eye, shortest obtainable interval, exclusion of diascleral light, reduction of dispersion and reflexion of the testing light to a minimum, and exact determination in degrees of eccentric parts of the retina, not only in the horizontal but also in the oblique meridians.

C. Zimmermann.

Caesar, Julius. **Problem of ophthalmological methods of examination.** Oft. Sbornik, 1930, v. 5, pp. 223-237. The author discusses the methods proposed at the various international meetings.

G. D. Theobald.

Ferree, C. E., Rand, G., and Monroe, M. M. **Diagnostic scales for the 1-degree and 0.17-degree form field stimuli for the eight principal meridional quadrants taken separately.** Arch. of Ophth., 1931, v. 6, Oct., pp. 518-534.

The authors find that emmetropes and hyperopes have the larger fields, and myopes and presbyopes the smaller, though in some quadrants this does not hold. The scatter, or variation, is greater with the 0.17-degree stimulus than with the 1-degree stimulus. For the 1-degree, the smallest amount of scatter occurs in the 180 degree meridian, and the greatest in the 45-degree meridian.

M. H. Post.

Haas, F. **A method for numerical evaluation of the light sense.** Zeit. f. Augenh., 1931, v. 75, Aug., p. 58.

The usual definition of light sense, namely the ability of the eye to discriminate light differences, is incomplete. It is a variable but it is not accurate to identify it with adaptation. The light sense is the ability to perceive light intensity, but this ability varies in a definite orderly manner. Light sense does not consist of varying degrees of sensitivity, but its essence is the manner of change through the varying degrees of sensitivity. It is a function in the mathematical as well as in the physical sense. It can be measured by determining the light of least intensity which can be discriminated at a certain time interval after the state of least sensitivity. For normal as well as abnormal light sense it is possible to calculate a

numerical value for the light sense by means of a working integral. If normal light sense is taken as unity, abnormal light sense can be expressed as a fraction. The mathematical expressions can be interpreted as statements of variations in the balance between the process of building up and breaking down of visual purple and other visual substances, or balance of the actinic vital energies.

*F. Herbert Haessler.*

Lopez Lacarérrre, J. **A registering photocampimeter.** Arch. de Oft. Hispano-Amer., 1931, v. 31, April, p. 223.

Photocampimetry simplifies the Bjerum and Lundsgaard methods, dispenses with cumbersome apparatus, screen, large amount of space, makes the examination less fatiguing to patient, eliminates the Troxler fatigue phenomenon, and compels examination in dark adaptation. The principle of the author's campimeter, which is described and illustrated in detail, consists in optically projecting a luminous point as a stimulus and a luminous cross as a fixation point against any smooth white wall, the former placed alongside the patient's head and the latter under the eye to be examined. The apparatus is arranged for a one-meter working distance, but can be adjusted for other distances, and is mounted on a base permitting rotation of thirty degrees. Registration is provided for by a spring operated pin at the back of the instrument, and by a chart. A rotating diaphragm in front of the electric bulb provides for variation of size and color of stimulus. Intensity of illumination can be controlled. The advantages claimed for the apparatus are: manipulation of stimuli at a distance from the screen; small size of apparatus; rapidity of examination; rapidity in changing size and color of stimuli; control of intensity of illumination; and adjustment for field taking at any distance.

*M. Davidson.*

Malbran, J. **Perimetry.** Arch. de Oft. de Buenos Aires, 1931, v. 6, June, p. 363.

Perimetry is quantitative and no one apparatus will answer all its require-

ments, a screen, a perimeter and a stereocampimeter being required. The perimeter is most useful for defects of the extreme limits of the field, and the screen for paracentral lesions up to thirty degrees from the point of fixation, while the stereocampimeter is utilized for study of the central area. The most useful test objects, colored and white, are of 2, 5, 7, 10, 15 and 20 mm. diameter, attached to fine black flexible wires. It is better to proceed from the area of blindness to that of visibility. The visual correction should also be worn.

*A. G. Wilde.*

Meesmann, A. **A simple appliance for artificial illumination of the perimeter.** Klin. M. f. Augenh., 1931, v. 87, Aug., p. 235.

An apparatus which gives a more constant illumination than variable daylight is described and illustrated.

*C. Zimmerman.*

Mock. **Fluorescein in tablets.** Klin. M. f. Augenh., 1931, v. 87, Oct., p. 514.

Mock has devised and recommends compressed tablets of 0.0004 fluorescide of sodium, manufactured by E. Merck, Darmstadt. They are dissolved in lacrimal fluid after twenty-five seconds and are in no way irritating.

*C. Zimmerman.*

Pines, N. **The ophthalmoscopic evidence of death.** Brit. Jour. Ophth., 1931, v. 15, Sept., p. 512.

The signs usually described in textbooks as observed in the fundi immediately after death are: change of the yellowish red to a yellowish white; emptiness of the vessels on and near the disc in contrast with the peripheral vessels; pneumatosis.

The author has observed the following additional signs: By gentle pressure on the eyeball immediately after the circulation has ceased one can make the veins and then the arteries collapse on the retina near the disc, but of course, in contrast to the living eye, no venous or arterial pulse appears. In the author's experience, in persons not suffering from aortic regurgitation, within one or two minutes after death the disc be-

comes pale but the retina remains rosy, the arteries are not changed, but the veins seem flatter. Arteriovenous compression is still preserved on the retina and disc. Later, the disc grows dead-white, the retina more rosy; the arteries become thinner and the veins more blackish but not tortuous (in the living increased blackness is usually accompanied by increase in tortuosity), and the vessels on the disc are nearly empty but still visible. After that (fifteen to twenty minutes) the blood column in the arteries begins to break up, first of all on the retina near the disc and at the points of arteriovenous compression. The retina is paler, but still rosy. Still later (one to two hours) the retina is white and the media become more hazy, but some of the large arteries are still visible on the retina as slightly darkened lines, interrupted in places. The same applies to the veins, but they are less visible. Early bubbles of air in the veins, contrary to the statement in many textbooks, were not observed.

The explanation of all these phenomena seems to be in the loss of muscular tonus of the arteries and of the heart.

*D. F. Harbridge.*

Schmelzer, Hans. **A simple method of examination for hemianopic immobility of the pupil with the slit-lamp.** Klin. M. f. Augenh., 1931, v. 87, Aug., p. 200. (Ill.)

The method is described in detail. The author found it superior to the methods of Behr and Hess, as the amount of pupillary reaction is greater and thus the evaluation easier.

*C. Zimmermann.*

Schmerl, E. **A simple illumination of the perimeter.** Klin. M. f. Augenh., 1931, v. 87, Aug., p. 240. (Ill.)

For securing uniform illumination of the perimeter the lamp is placed near the eye of the patient by means of an apparatus which is described and illustrated.

*C. Zimmermann.*

## 2. THERAPEUTICS AND OPERATIONS

Gilbert, W. **Operations on the eye; pathology and therapy.** Med. Klin., 1931, June 19, p. 929.

A general résumé of some of the newer operative procedures is given, and the reactions of the eye to medicaments, also a general discussion of brain tumors in relation to the eye findings. This article aims to present certain facts to the general practitioner.

*Beulah Cushman.*

Graf, Kornelia. **Iridectomy and lens injury.** Zeit. f. Augenh., 1931, July, v. 74, p. 376.

The author studied histologically the excised piece of iris from twenty-two cases of iridectomy for glaucoma. Lens capsule was found adherent to the iris four times, and in each instance a toothed forceps had been used. In twenty-three cataract extractions loose capsule was found three times where a toothed forceps had been used, and not at all in nine iridectomies done with anatomical forceps. It is clear that the toothed iris forceps is a dangerous instrument.

*F. Herbert Haessler.*

Hofe, K. vom. **On the effect of cauterization on regeneration.** Klin. M. f. Augenh., 1931, v. 87, Aug., p. 191.

The author reports his experiments on rabbits by cauterization for one second of the subconjunctiva or cornea whose epithelium had been abraded or removed with the trephine. In the majority of cases the regeneration of the epithelium of the cauterized eye was faster than that of the abraded, but not cauterized, cornea of the other eye. As the surrounding tissue is only very little heated by the cautery, the heat can have only a very slight effect, nor can one speak of a direct influence. The predominant action must be merely indirect. Probably the common effective principle in all these and similar experiments lies in the destruction of diseased and healthy tissue.

*C. Zimmermann.*

Kolar, V. **Percaine and its use in ophthalmology.** Oft. Sbornik, 1930, v. 5, pp. 239-240.

On instillation into the conjunctival sac percaine is slowly absorbed and a deep anesthesia is obtained. It dissolves very well and may be sterilized by boil-

ing. In 161 eye operations it was found useful, especially in cataract extractions, as anesthesia lasts six or more hours. Adrenalin is used to counteract capillary dilatation. Novocaine and percaine form an effective combination. Beyond edema of the conjunctiva and lids, no secondary effects were observed.

G. D. Theobald.

Lopez Enriquez. **Simple means of reinforcing action of eye drops.** Arch. de Oft. Hisp.-Amer., 1931, v. 31, May, p. 293.

It is a common observation that the action of eye drops depends on the length of time they remain in the conjunctival sac. Length of contact can be powerfully increased by using pledgets of cotton soaked in the solution. The author leaves these in for from ten to forty minutes. The most striking results are obtained with adrenalin, permitting mydriasis for ophthalmoscopy, aiding in the breaking up of synechiae, and facilitating surgery on the lids. The action of adrenalin thus applied is so powerful that the skin of the lids pales at the corresponding point.

M. Davidson.

Mauger, P. **A leverlike blepharostat.** Ann. d'Ocul., 1931, v. 168, Aug. pp. 663-665.

This speculum was designed to reduce the danger of vitreous loss by lid action. It is constructed of steel wire dividing from a spring loop into two arms, each arm ending in a bend to engage the lid margin. A lever runs back from the bend to support the cul-de-sac. A removable screw limits the spread but is ordinarily not used, because of its added weight. H. Rommel Hildreth.

Merida Nicolich. **What should not be forgotten about ocular antiseptics.** Arch. de Oft. Hisp.-Amer., 1931, v. 31, May, p. 280.

Discrimination in the use of ocular antiseptics, in conformity with pharmacodynamics, is advocated. Antiseptics in general, depending for their action on plasmolysis, or on their solubility in lipoids of bacterial cell membrane, or

on coagulation of albuminoids of cell protoplasm, are weaker in the presence of a tissue medium rich in those substances such as is provided by conjunctival inflammation. Zinc and cadmium sulphate and also mizin, while inhibiting growth of diplobacilli, depend for their action mainly on desquamation of surface epithelium on which the diplobacilli grow, and the desquamated epithelium must be washed away, and the lid borders and canthi should be rubbed with Greifswald dyes to make sure of the desquamation. Optochin must be used every two hours to avoid resistance to the quinine base. Silver nitrate, copper, and mercury bichloride depend for their specific action against gonococci and Koch-Weeks bacilli on penetration to deeper epithelial layers where they grow, and secretion must be washed away before their application. Their organic substitutes are not their equals. The soluble mercurials are plasmolytic and are indicated in presence of oily lid borders. Ectogan which acts by liberation of oxygen, and chloramin because of chlorine liberation, are indicated in wounds. Iodoform finds its field of usefulness in tuberculous lesions because it promotes granulations, xeroform and noviform are only astringents, and vioform and loretinate of bismuth, because of their antiseptic qualities, are useful in the presence of skin lesions accompanying conjunctival disease. Yellow oxide of mercury acts by liberating potassium hydrate in the presence of sodium chloride, and its irritating qualities cannot be eliminated without diluting its potassium hydrate content. Quartz bottles should be employed for solution of salts of alkaloids, to prevent decomposition of the alkaloid base, and aqueous solutions should be isotonic to be absorbed by the corneal epithelium, the principal portal of absorption.

M. Davidson.

Miklós, Klein. **Preservation of eye drops.** Brit. Jour. Ophth., 1931, v. 15, Nov., p. 649.

This contribution concerns methods of preservation of eye drops free from microorganisms. Different esters of paraoxybenzoic acid were tried and it

was found that the most suitable was the propylester in 0.05 percent concentration. The eye drops thus prepared entirely inhibited the growth of micro-organisms. The eye tolerated well the eye drops thus prepared.

*D. F. Harbridge.*

**Romeick, F. Fixation of the eyeball in operations.** Klin. M. f. Augenh., 1931, v. 87, Oct., p. 512.

Romeick has devised a method for making fixation of the eyeball absolutely sure and independent of tearing of brittle conjunctiva. He inserts close to the limbus, through the conjunctiva and the superficial layers of the sclera, a suture which is tied and cut off short. The little knot can be easily grasped with the fixation forceps and never tears out. After the operation it is cut off.

*C. Zimmermann.*

**Terson, A. Akinesia of the superior rectus and orbicularis through the conjunctiva.** Ann. d'Ocul., 1931, v. 168, pp. 653-659.

To weaken the orbicularis muscle an injection is made at the outer canthus, passing the needle through the conjunctiva. The needle penetrates through the lid to make the injection under the skin. Without removing the needle entirely the injection is made above and below. The author uses two percent novocaine or a weak solution of cocaine. More complete akinesia can be obtained by subconjunctival and orbital injection through this same opening. The superior rectus muscle is injected by grasping the tendon and passing the needle along the temporal side.

In cataract extraction complete akinesia is often beneficial. Partial akinesia is sufficient for strabismus operations. In such cases as panophthalmitis subcutaneous injections should be made instead of subconjunctival.

*H. Rommel Hildreth.*

**Terson, A. A better type of electric light for the operative field.** Ann. d'Ocul., 1931, v. 168, Aug., pp. 659-662.

As a source of illumination in diagnostic work the author has used a flash-

light with the lens on the side at one end. Ear specula are adaptable to the lens, giving narrow beams of light. A small bulb with suitable reflector can be lighted by the city current or a dry cell. Either light can be pinned to the surgeon's chest. *H. Rommel Hildreth.*

### 3. PHYSIOLOGIC OPTICS, REFRACTION, AND COLOR VISION

**Brückner, A., and Franceschetti, A. Myopia of the childhood period.** Arch. f. Augenh., 1931, v. 105, Oct., pp. 1-12.

Brückner and Franceschetti describe a possibly congenital type of myopia of early childhood that they feel is distinct from so-called school myopia. They report the condition in twenty-five children six to eight years of age. The myopia varied from 3 to 25 diopters and was usually accompanied by astigmatism of from 1.5 to 3 diopters. Ophthalmoscopically, these cases presented a characteristic picture. The disc was normal and often oval in shape. In almost every case a small temporal conus was present. The pigment was thinned out round the disc, but in the macular area there was a brownish pigmentation of approximately one disc diameter. A large, tortuous choroidal vessel was frequently visible between the macula and the disc. Perimetric fields and color sense were normal in all cases. Two-thirds of the twenty-five children examined were boys.

*Frederick C. Cordes.*

**Cucchia, A. The influence of oblique astigmatism on the visual acuity of the retinal periphery.** Ann. di Ottal., 1931, v. 59, July, p. 660.

It is commonly held that the proportionally lower visual acuity of the periphery of the retina in relation to the macular center is dependent upon the different distribution of the sensory elements, while in minor degree contributing factors are the imperfect foci due to oblique astigmatism and to diminished illumination of the peripheral image. The amount of light which comes to the retina depends for one factor on the size and shape of the pupil. For the rays coming from an oblique angle, the

pupillary area is ellipsoidal. The author demonstrates experimentally, however, that the incident rays passing obliquely through the cornea to the retinal periphery exercise slight influence on the visual acuity of that area. In fact, when the astigmatic meridians are corrected by suitable cylinders, although there is some increase in the acuity of vision, it is small in relation to corresponding uncorrected areas. Hence the astigmatism plays only a minor part in the diminished acuity, the major part being due to the anatomic and physiologic factors.

Park Lewis.

Friedman, Benjamin. **The blue arcs of the retina.** Arch. of Ophth., 1931, v. 6, Nov., pp. 663-674.

Blue arcs of the retina were first described by Purkinje in 1825. Red seems to be the best color to develop them, but they may be seen under the greatest variety of conditions. Hubbard observed that if he fixed his gaze to the temporal side of a circular stimulus, he observed both arcs converging to the blind spot; fixation on the upper edge produced the lower arc; on the lower edge the upper arc; and fixation on the nasal edge a triangular blue light, the base of which corresponded with the stimulating circle, tapering to its apex at the blind spot. Allowing the stimulus to travel inward toward the fovea, or outward away from the fovea, demonstrated a ring of maximum intensity surrounding the fovea. In direct fixation no phenomenon was observed. Amberson demonstrated a break in the arcs in a patient with a scotoma lying between the blind spot and the fixation point, but the blue arcs extended farther into the blue blind region than the limits of the scotoma.

To the observations previously reported, the author adds others from personal observation. Light pressure on the globe produces blue waves of color, harder pressure a greenish or reddish tinge of drab unsaturated color, and still harder pressure a loss of all color. Upon removing the pressure, a reversal of the phenomena takes place. The experiment indicates the greater sensi-

tivity of the blue receptors. Since the phenomena do not appear when the fixation point alone is stimulated, the question arises as to involvement of the cones in the reaction. The author suggests that the rods were probably the earliest recipients to develop and that the primitive color sense was pushed into the background, but while it lasted was undoubtedly most acute in the central portions of the retina. Thus is explained, according to the author, the greater sensitiveness for this phenomenon of the region of the retina immediately surrounding the macula.

M. H. Post.

Inouye, T. **Axis designation according to the combined hour and degree system.** Klin. M. f. Augenh., 1931, Sept., p. 335.

Inouye proposes and describes a new system for uniform designation of the axis in astigmatism. C. Zimmermann.

Maggiore, L. **The optical basis of skiascopy.** Ann. di Ottal., 1931, v. 59, June, p. 483, and July, p. 579.

The scope of this study is to analyze the more important theories concerning the shadow movements, to utilize such as are applicable, and to clarify subjects not readily understood by students. Each point is taken up in orderly manner, and the diverse elements entering into the complex phenomena of skiascopy are illustrated by interpretative figures. The study is in two parts: first the theories, with the conclusions of other authors, second the author's own exposition of the subject.

Park Lewis.

Pascal, J. I. **Neutralization in dynamic retinoscopy.** Brit. Jour. Ophth., 1931, v. 15, Oct., p. 589.

Dynamic retinoscopy, briefly defined, is that method of retinoscopy in which accommodation either alone or in association with convergence is brought into play during the test.

In static retinoscopy, our test ends when neutralization of the light-and-shadow movement is obtained. Some watch for actual neutralization, while

others watch for the first reversal of movement, taking the lens just weaker as the one presumably giving neutralization.

The binocular dynamic retinoscopy test is made by instructing the patient, who is already wearing his statically found correction, to fix binocularly the letters on a small chart attached just above the mirror of the retinoscope. The examiner preferably works along the median line of the patient, holding the retinoscope so that it is equally distant from the two eyes of the patient. From this position the examiner rapidly and alternately "refracts" each eye. The size of the type used on the fixation chart varies with the purpose of the test.

*D. F. Harbridge.*

Pascal, Joseph. **Skiascopy with the photoscope.** *Zeit. f. Augenh.*, 1931, Aug., v. 75, p. 68.

In skiascopy without a cycloplegic it is hard for the patient to relax his accommodation, and it is impossible for the examiner to vary the angle at which he retinoscopes. To overcome this difficulty the author places between himself and the patient his photoscope, which is an object of fixation for the eye which is not being examined at the time. It consists essentially of a blue glass behind a diaphragm with a cross-shaped opening, illuminated from behind by parallel rays of light. The patient is not tempted to use his accommodation and is not dazzled by the light, and the examiner is free to assume any position which seems to him most advantageous.

*F. Herbert Haessler.*

Rössler, F. **As to Apin's articles on determination of refraction with the cobalt lamp.** *Klin. M. f. Augenh.*, 1931, v. 87, Sept., p. 323.

After detailed discussion of the subject, the author says that many investigations on a large material are still required to find the general law, but that it is not desirable to form a final judgment from isolated findings without consideration of sources of error.

*C. Zimmermann.*

Rugg-Gunn, A. **Contact glasses.** *Brit. Jour. Ophth.*, 1931, v. 15, Oct., p. 549.

This is an extensive discussion of the subject of contact glasses. Historically, records show experimental attempts as early as 1827. In the present day two types are in use, Zeiss's ground glass and Müller's blown contact glass. Each has certain advantages. Zeiss ground glasses are at present more popular. They are furnished in two sets ranging in corneal radii from 5 to 11 mm. The small set contains test glasses of whole numbers, the larger sets include the 0.5 mm. sizes. In fitting the glass the author uses a two percent saline solution diluted with an equal part of hot water. This gives a warm solution of approximately one percent for the fluid meniscus. Holocaine two percent obtunds corneal sensibility.

The glass may be inserted as follows: A small rubber sucker is applied to the convex surface to pick up the glass, which is then held vertically by the attached bulb and filled quite full with saline. The patient leans forward until his face is almost horizontal, and while he is in this posture the surgeon controls the eyelids with the fingers of his left hand and directs the patient to look at the glass. The contact glass, containing saline, must be kept level and gradually apposed to the cornea. The lower rim is first inserted into the inferior fornix, and as the fluid touches the cornea both lids are swept over the glass by the left hand and the suction bulb removed. The following two precautions help: the fluid should be warm and the approach to the cornea gradual and gentle.

Two separate and distinct determinations have to be made during the examination, and of these the first is by far the more important: (1) the exact fit of the scleral brim; (2) the refractive power. With a contact glass there is no corneal astigmatism. The effect of the fluid meniscus between the cornea and the glass is that the cornea as an optical entity disappears.

The contribution discusses the subject under the headings of optical theory, size of retinal image, cardinal points, axial ametropia, magnification

of retinal image, index ametropia, accommodation, and aphakia.

As to variety of uses, a much more extended experience of contact glasses than obtains today will be necessary before we know to what extent contact lenses will be employed in the future.

D. F. Harbridge.

#### 4. OCULAR MOVEMENTS

Bartels, Martin. **Are there separate pupillary fibers for the consensual reaction?** Zeit. f. Augenh., 1931, v. 75, Aug., p. 22.

In a twenty-three-year-old girl whose clinical findings led to the diagnosis of an orbital inflammation, probably tuberculous, very near the optic nerve, the vision partially returned under treatment. The pupillary reactions of the affected right eye never did return, though the right pupil could be made to contract actively by illuminating the left eye. The striking manifestation was that, though illumination of the right eye did not cause the right pupil to contract, it did produce a slight though definite contraction of the left pupil. The rigidity of the right pupil is easily explained by assuming disease of the right optic nerve. Since the consensual reaction from the left eye and the lid closing reflex were active, it follows that the centrifugal portion of the right pupillary arc was intact. If we assume that the centripetal fibers are destroyed we must postulate separate pupillary fibers in the optic nerve. To explain the reaction of the left pupil to illumination of the right eye we must postulate separate fibers for direct and consensual reactions. The separate functions might be conducted by separate primitive fibrils of the axon. Bartels emphasizes that the great importance of the fibrillary structure of the axon is unfortunately not sufficiently recognized by most authors. F. Herbert Haessler.

Bielschowsky, A. **Unilateral and dissimilar (dissociated) vertical movements of the eyes.** Graefe's Arch. 1931, v. 125, p. 493.

In spite of the great variety of widely differing clinical manifestations, the

anatomico-physiological basis of all forms of unilateral and contrary vertical movements of the eyes is very probably the same. It is readily proved that these unilateral vertical movements are not to be referred to a unilateral innervation of the eye concerned, as was previously thought, but rather to simultaneous distinct and opposing innervation to both eyes.

When in both eyes the inferior oblique muscle exerts a greater or lesser action than the superior oblique, there occurs a squinting upward or downward of the eye on the side opposite to which both eyes are directed. Voluntary elevation or lowering of the eyes has no influence upon the degree of vertical divergence.

Alternating or dissociated hyperphoria is present when with the eyes directed straight forward either each eye alternately deviates upward or each alternately squints upward or downward, in other words either a positive or negative vertical divergence is present entirely independent of the direction in which the eyes are looking. Binocular fixation exists as long as the action of the fusion impulse is not impeded.

Besides the cases with retained ability for binocular fixation, in which dissociated upward squinting only occurs occasionally or in elevation of the eyes, thus increasing the difficulty of fusion, there exist similar disturbances of the vertical motors in permanent convergent and divergent strabismus with retained ability for alternating fixation. In these cases the noncomitant or dissociated vertical squint component is frequently overlooked unless a dark glass is held before the fixing eye so as to cause an isolated upward movement of the squinting eye.

Dissociated vertical deviations of the eyes are exceptionally common in cases with unilateral amblyopia or amaurosis.

The anatomico-physiological basis of the unilateral and dissimilar vertical movements of the eyes would seem to lie in an abnormally increased activity of the cortical visual center concerned with vertical motions of the eyes. This increased activity is latent as long as

an equivalent stimulus is sent from each retina, influencing equally the motor centers, whereas when the stimulus from one retina is weakened or excluded, the increased activity of that vertical divergent center becomes manifest by deviation of the corresponding eye upward or the other eye downward, according as fixation is done with the former or the latter eye.

*H. D. Lamb.*

Dudinov, O. **Treatment of strabismus according to Salvati.** Klin. M. f. Augenh., 1931, v. 87, Sept., p. 371. (III).

Salvati's treatment of strabismus consists in putting out of action the prevalent ocular muscle by injection of alcohol. Dudinov treated two cases according to this method and reports the clinical histories. The immediate effect was a decrease of strabismus by twenty-five degrees, but the gain fell to 5° and 10° after 3.5 and 2.5 months. The injections were complicated by intense pain (so that after half an hour morphine had to be injected), edema of the lids, chemosis, horizontal mydriasis, and paralysis of accommodation, due to direct influence of the alcohol on the intrinsic muscles. It seems that the effect of the alcohol injection is not connected with the immediate paralysis of the motor nerve fibers, which is only transitory, but with the sclerosing action, due to the development of cicatricial tissue in the muscle itself with subsequent atrophy of its fibers. The method can by no means supplant tenotomy.

*C. Zimmermann.*

Dusseldorf, M. **Ocular symptoms of myasthenia gravis pseudoparalytica of Erb-Goldflam.** Rev. Oto-Neuro-Oftal., etc., 1931, v. 6, June, p. 189.

This comprehensive article gives the views of various authors regarding the ocular symptoms of this rare affection, and two cases are reported in detail. On account of the marked eye involvement, the disease is usually seen first by the oculist. It appears more frequently in women between twenty and forty years of age, and begins with an occipital headache which for years may remain

the only symptom. The eye muscles then become involved, followed by those of the palate, tongue, neck and trunk. There is a marked fatigue of the affected muscles, which at first show recovery after varying periods of rest. With the exception of the muscles of the face and eyes, the involvement is usually symmetrical. Even when moderately advanced, the face appears ironed out and expressionless, with ptosis and a fixed gaze. There may be total ophthalmoplegia with paralysis of the lips so that they sag open and cause a constant drooling of saliva. The entire course may be acute with death in less than two months, or it may be extended to thirty-five years. No treatment is found effective and the cause is still unknown.

*A. G. Wilde.*

Jameson, P. C. **The surgical entity of muscle recession.** Arch. of Ophth., 1931, v. 6, Sept., pp. 329-361.

The author has demonstrated to his own satisfaction that the procedure of receding an ocular muscle and suturing it to the sclera is safe as far back as the equator. For this purpose he has devised a special needle such that the thread will not bulge at the eyelet. He concludes that in about ninety percent of operations on suitable cases the end results are satisfactory, and that in the ten percent of unsatisfactory cases undercorrection, rather than overcorrection, will be the rule, provided the operator has been conservative in his procedure. Approximately twenty-five degrees of correction follows 5 mm. of recession, but the effective result is less in external than in internal deviations.

*M. H. Post.*

Mayer, L. L. **Ocular convergence: its relation to basal metabolism and endocrine disease.** Arch. of Ophth., 1931, v. 6, Sept., pp. 389-391.

Möbius' sign has long been recognized in exophthalmic goiter, but no correlation between the phenomenon and basal metabolism has been attempted. A series of 150 patients were examined with this point in mind. A table is given of the various types of case

examined and the average convergence near point is recorded for each group, with the average basal metabolism of each group. For all types the average near point was plus 4.9. Toxic adenoma and tachycardia were accompanied by poor convergence and high basal metabolic rates. Cases of obesity and hypothyroidism showed low basal metabolism and satisfactory convergence. Myxedema, with its minus metabolic rate, unexpectedly showed marked weakness of accommodation.

M. H. Post.

Ohm, Johann. **Optokinetic nystagmus in its application to practice.** Zeit. f. Augenh., 1931, v. 75, Sept., p. 146.

Optokinetic nystagmus is a subject the practical importance of which has been entirely overlooked, while the investigation of vestibular nystagmus has become part of the daily work of a practitioner. To induce nystagmus Ohm uses a revolving drum 40 cm. in diameter, 20 cm. high, placed 50 cm. from the patient, and on which are white and black stripes respectively 4 and 0.5 cm. in diameter. Brunner places his patients under a larger drum which has the stripes on the inner surface. This involves the entire retina in the optokinetic stimulus, which is ideal for certain practical and theoretical purposes. However, its use is limited to horizontal revolutions and precludes graphic recording. The drum makes one revolution in from 2.5 to 9 seconds, and for most of his investigations Ohm used 4.5 to 5 seconds.

The purpose of optokinetic stimulation is to determine threshold value. This can be accomplished in three ways: (a) by determination of a narrow stripe capable of inducing nystagmus; (b) by the size and position of the angle of exposure; (c) by determining the maximal and minimal rate of revolution of the drum. In red-green color blindness nystagmus is greater with black and white stripes than with red and green. Eyes with congenital nystagmus react in three ways: (1) Optokinetic nystagmus is regular (rare). (2) It is inverted, that is, the nystagmus is

in the same direction as rotation. (3) All optic reaction to revolution is absent. The latter phenomenon is useful in distinguishing congenital amblyopic nystagmus from other forms, which is often difficult. F. Herbert Haessler.

Peter, L. C. **Advancement and other shortening operations in concomitant squint.** Arch. of Ophth., 1931., v. 6, Sept., pp. 380-388.

The author of this paper from his past experience feels that: (1) complete tenotomies are dangerous and partial ones are of little value; (2) in performing recession, care should be taken not to reduce convergence beyond that required for sustained work at the near point; (3) advancement corrects more error than recession, and, when combined with recession, results in the maximum amount of correction. Whether a bilateral advancement or an advancement combined with recession should be done depends upon, first the character of the squint, second the presence or absence of incurable amblyopia, and third, the exercise of good surgical judgment. It should be remembered, furthermore, that operations on the interni are more painful than those upon the externi. Advancement combined with recession should be done where the squint is alternating and convergence is inconsequential, or the amblyopia of long standing and such that it cannot be corrected. On the other hand, if the squint is monocular and amblyopia can be corrected, it is questionable whether the operation should be done on one or both eyes. The author prefers the latter. In the case of double advancement, the two eyes should not be operated on at the same time.

In conclusion, the author presents his own table or guide for operation. In squints of ten degrees or less, a resection or tucking is indicated; for fifteen degrees, advancement, with recession if necessary; for twenty degrees, advancement and recession; for from twenty-five to thirty degrees, double advancement, combined with recession if necessary; for thirty degrees or more, double

advancement with recession, in one or both eyes. Should exotropia be present, the same procedure should be carried out, remembering that all operations are from twenty to thirty percent more efficient on the interni than on the externi.

M. H. Post.

Peter, L. C. **End results in monocular esotropia.** Brit. Jour. Ophth., 1931, v. 15, Nov., p. 642.

The author expresses the conviction that the ideal goal can be obtained in the vast majority of young squinters, if systematic measures are instituted, if the squint is treated at the proper age, and if cooperation of the parents can be obtained. The ideal results include good visual acuity in the squinting eye, single binocular vision, good convergence, and comfort for the patient after treatment is completed.

The factors which interfere with ideal results are: (1) amblyopia ex anopsia, which under proper conditions is remedial, except in a few instances; (2) undeveloped or absent fusion faculty, which if totally absent cannot be developed but if present in moderate degree can be awakened.

The factors which favor ideal results are correction of refractive errors, prevention and correction of amblyopia ex anopsia, training of fusion faculty, and operative interference. When operative procedures are instituted the basic principles to be observed are: The converging power of the internal recti should be preserved. If the squint can be corrected by shortening one or both external recti, the results will be most satisfactory and normal convergence will not be placed in jeopardy. Supplementary operations, if necessary, should be reserved for the internal recti. Only such operations should be selected as will admit of the most accurate correction of the squint. Cosmetic appearance of the bulbar conjunctiva is worthy of serious consideration.

D. F. Harbridge.

Sajdova, V., and Dosuzkov, T. **Case of abortive epidemic encephalitis.** Bratislavské Lekarske Listy, 1931, v. 11, Oct., p. 453.

In a woman aged thirty-one years the main symptom of the disease was recurrent attacks of rotation of the eye upward.

#### 5. CONJUNCTIVA

Bailey, J. H. **Lesions of the cornea and conjunctiva in erythema exudativum multiforme (Hegra).** Arch. of Ophth., 1931, v. 6, Sept., pp. 362-379. (See Section 6, Cornea and sclera.)

Comès, Paul. **Inquiry on the epoch of familial contamination of trachoma in Hué (Annam).** Ann. d'Ocul., 1931, v. 168, Oct., pp. 826-831.

This is a statistical study, chiefly in tabular form, of a series of 731 infants aged one month to five years. The paper is not suitable for abstraction.

H. Rommel Hildreth.

Comès, Paul. **Subconjunctival autohemotherapy.** Ann. d'Ocul., 1931, v. 168, Oct., pp. 831-838. (See Section 6, Cornea and sclera.)

Hertz, V. **A case of gonorrhreal ophthalmia.** Oftal. Selskab i København's Forhandlinger, 1930-1931, pp. 44-45. In Hospitalstidende, 1931, Oct. 29.

A woman of thirty years came showing a copious discharge of pus from the right eye. In spite of the large amount of pus and a moderate swelling of the lids, the bulbar conjunctiva showed scarcely any injection. Following the use of silver nitrate (0.2 percent) and argyrol, the secretion promptly disappeared, and for a month there was only slight irritation of the conjunctiva with scanty secretion. Then the original condition suddenly returned and it took another month to obtain a permanent cure. Thorough laboratory examinations were made in order to establish with certainty the identity of the infection (gonococcus). The case is reported in order to call attention to the fact that light cases of this disease sometimes occur in adults.

D. L. Tillerquist.

Kesten, B. M. **Conjunctivitis and blepharitis due to yellow mercuric ox-**

**ide.** Arch. of Ophth., 1931, v. 6, Oct., pp. 582-588.

A short résumé of some of the well known drug sensitivities of the conjunctiva is given, after which a case is reported of unusual sensitivity to the commonly prescribed yellow oxide of mercury. Twelve hours after the initial use of zinc sulphate and 0.5 percent yellow mercuric oxide, a beginning redness and swelling of the eyelids was noticed. The treatment was nevertheless persisted in, and the following morning the swelling had spread and the eyes had begun to itch and burn. The appearance was strikingly like that of erysipelas, except for the lack of rise in temperature. The condition healed in two weeks. Similar reactions had appeared three years before, but only after the use of the ointment for three weeks. There was no history of other sensitivity.

From this case and others in the literature, it appears that such reactions to mercuric oxide are the result not of poisoning or irritation, but rather of an allergic phenomenon. Where the skin tests are positive, the circulating antibodies in the blood are rarely demonstrable.

M. H. Post.

**Mamoli, L.** Contribution to the study of vernal conjunctivitis. Saggi di Oftalmologia, 1929, v. 5, p. 362.

From his study of thirty-five patients Mamoli concludes that in the majority of such cases there exists a vagotonia from suprarenal hypoactivity. Negative results from cutaneous tests with pollens and foods, and the absence of hematoporphyrin in the blood and urine, excluded allergy and photosensitization as possible causes. The greater number of cases were associated with vasomotor rhinitis.

The most rational and efficacious treatment proved to be small tridaily doses of adrenalin by injection, associated with intramuscular injections of calcium. Local treatment with a collyrium of cocaine and adrenalin was of great benefit, especially to the pruritus. A pomade of cocaine and adrenalin was prescribed for the nasal treatment of the vasomotor rhinitis. Where the in-

dications present themselves, the use of parathyroid, testicular, or thyroid extracts is advisable.

From the above treatment very satisfactory results were obtained, although in a small number of cases the benefit was only transient. F. M. Crage.

#### 6. CORNEA AND SCLERA

**Bailey, J. H.** Lesions of the cornea and conjunctiva in erythema exudativum multiforme (Hebra). Arch. of Ophth., 1931, v. 6, Sept., pp. 362-379.

Three cases are reported, two observed by the author in his own practice and watched throughout their course, while the third was called to his attention by a colleague. The disease is characterized by (1) an onset characteristic of acute infection, (2) severe inflammatory changes resulting in marked loss of vision and occasionally destruction of the eyeball, (3) intense pseudomembranous inflammation of the mucous membranes, (4) a widespread polymorphous eruption of the skin, (5) increased or decreased leucocyte count, and (6) protracted course.

M. H. Post.

**Churgina, E.** Further experiments on the mutual interaction of isolated tuberculous foci in skin and cornea. Klin. M. Augenh., 1931, v. 87, Sept., p. 354.

The experiments, described in detail, revealed a marked interaction of two isolated tuberculous foci, not only if both were located in the cornea but also if one of them was in another tissue of the same rabbit; namely, a decided mitigation and abbreviation of the course of the process in both foci. The experiments left no doubt that an isolated tuberculous focus of the cornea yielded a general relative immunity of the whole organism against infection of the animal with the tuberculous virus.

C. Zimmermann.

**Comès, Paul.** Subconjunctival autohemotherapy. Ann. d'Ocul., 1931, v. 168, Oct., pp. 831-838.

Blood is taken from the patient's vein and 1 c.c. immediately injected under the conjunctiva. In corneal ulcers and

pannus the conjunctiva is raised surrounding the cornea. For conjunctival trachoma the injection is made above the tarsus in the retro-tarsal fold. The blood disappears within ten days. No infections nor other complications arose in three hundred injections. Several case reports are given which show excellent results. *H. Rommel Hildreth.*

D'Amico, D. **On the surgical treatment of corneal trachomatous pannus.** Ann. di Ottal., 1931, v. 59, July, p. 652.

Histologically pannus consists of masses of round mononuclear cells, with little protoplasm, and is of a lymphoid nature analogous to that found in the palpebral conjunctiva. This tissue has in it numerous vascular offshoots and occupies the superficial surface of the cornea, from which it is separated as Bowman's membrane is from the epithelium. The genesis of pannus is dependent upon several factors. There are individual differences in susceptibility because of lessened power of resistance of the cornea in certain cases. There is no doubt that the trachomatous virus is carried from the bulbar conjunctiva. Pannus develops when cicatrization begins to replace the soft papillæ and adenoid tissue. The presence of entropion and trichiasis is a contributing cause. These lead to very slight abrasions in the epithelium through which the infecting material passes to the corneal substance. It is also apt to occur where there is a narrow palpebral aperture. The result of a generous canthoplasty in these cases by releasing the pressure often gives unexpectedly happy results. By interrupting the continuity of the vascular supply around the cornea the possibility of carrying the virus to the cornea is greatly limited. This may be effectively accomplished by means of the galvanocautery, by division of the conjunctival tissue as in peritomy, by conjunctival excision as in peridectomy, or by vascular obliteration at the limbus. Canthoplasty is almost always of immediate benefit in conjunction with other suitable measures of treatment. (Bibliography).

Park Lewis.

Herbert, H. **The microorganism of Indian superficial punctate keratitis.** Brit. Jour. Ophth., 1931, v. 15, Nov., p. 633.

This note is on the question of the pathogenic agent responsible for the widespread and persistent epidemics of punctate keratitis seen in India. Presumably the same specific organism may account also for isolated cases of similar disease seen not only in India, but also in other parts of the world.

The author refers to his Bombay reports on this subject thirty years ago. The encapsulated bacillus appears to be confined entirely to the more active points of the disease. A strong fluorescein solution is instilled into the patient's eye, thus emphasizing the disciform phase of the disease, which presents a rounded central area of diffuse haziness with definitely raised margin. The closely packed bacilli appeared to lie exclusively at the surface of the epithelium, in hardly more than a single layer. Epithelial scrapings for examination were obtained by light touches at the stained spots with a broad needle well blunted. Gram stain showed the bacilli, but counterstaining with a pale diluted borax methylene-blue solution, followed by a similarly diluted eosin solution, sharply defined the colorless capsule. The average size of the bacillus, defined by the outer edge of the capsule, was  $1.6 \mu$  by  $3.2 \mu$ .

During the author's early work he failed to find the bacillus in only two or three out of two or three dozen eyes. He has no doubt that the bacillus is the living infective agent of the disease.

D. F. Harbridge.

Holm, E. **Rosacea keratitis (acne of cornea) without acne of face.** Oftal. Selskap i København's Forhandlinger, 1930-1931, pp. 41-44. In Hospitalstidende, 1931, Oct. 29.

The writer presented a married woman, forty-three years old, who suffered from a very persistent and painful affection of the corneas with marked photophobia, involving especially the right eye. The right eye showed a broad opacity simulating a rodent ulcer, ex-

tending from the nasal limbus toward the center of the cornea for a distance of about 4 mm., and joining below with a similar opacity pushing in from the temporal side. The surfaces of the opacities seemed depressed and stained with fluorescein along the edges. The left cornea presented a similar picture but only the nasal side was affected. The right eye had been involved for nearly two years and the left for ten months. At the onset of the present attack there had been in the sclera small, sharply defined, injected nodules from which the corneal scleroses seemed to originate. Attacks similar to the present but of shorter duration had occurred for a period of eight years. At no time had there been any acne of the face. The diagnosis was based on the presence of scleral nodules at the onset, on the typical course, and on the tendency to recurrence. A great variety of different treatments had been tried without result. It was brought out in the discussion that in cases of acne of the cornea iridectomy was often followed by rapid recovery.

*D. L. Tilderquist.*

**Key, B. W. Tuberculous keratitis.**  
Arch. of Ophth., 1931, v. 6, Sept., pp. 392-397.

A round, sharply defined, indolent ulcer appeared in the cornea, which through the course of several years threw off a slough, developed a descemetocoele, ruptured, and finally healed, following the covering of it with a large conjunctival flap. The process was considered tuberculous because of the family history, the positive response to inoculation with tuberculin, and the subacute and relapsing nature of the lesion, even though the bacteriological diagnosis could not be made out. Healing was probably due in large part to the induced vascularity of the lesion, the result of the conjunctival flap, which was allowed to remain in place for a period of five months. An excellent color plate of the healed lesion accompanies the article.

*M. H. Post.*

**Koby, F. E. Hereditary corneal degeneration of Groenouw type.** Bull. Soc. Franç. d'Ophth., 1930, p. 144.

Koby describes a case of Groenouw's degeneration in which the vision at the time of examination was 1/10 and 1/6. The cornea presented numerous small bumps especially marked in the region of the pupil. Between these areas the cornea was semi-opaque and it was only at the extreme periphery that normal transparency was present. The corneal microscope showed no sign of reticular formation. The nodules were not sharply delimited, were most numerous in the superficial layers, had no tendency to confluence, and their largest diameter did not exceed one-third of a millimeter. The thickness of the cornea was not noticeably modified and there was no trace of vascularization.

The patient was the eldest of a family of ten, of whom three were found to have the same affection. In addition a history of poor vision, possibly indicative of the same disease, was obtained for the mother, her brother, the paternal grandfather, and his son. Two minor children of the patient presented normal eyes, but since the disease habitually develops after puberty these subjects were too young for the affection to be absolutely exclude.

*Phillips Thygeson.*

**Löwenstein, Arnold. The indications and technique of Denig's transplantation of mucous membrane.** Klin. M. f. Augenh., 1931, v. 87, p. 390.

Löwenstein reports his improved technique. He summarizes as follows: The transplantation of mucous membrane is only indicated in the cicatricial stage of pannous trachoma, after subsidence of inflammatory phenomena. Excision of the shrunken conjunctiva is superfluous and illogical. The conjunctiva is incised with the scalpel at the limbus and dissected backward beyond the equator. By inserting an interim prosthesis a deep conjunctival sac is obtained and by retraction of the conjunctiva a wide strip of sclera is exposed, which is covered by thin oral mucous membrane. This procedure is also indicated in nontrachomatous shrinking of the conjunctival sac.

*C. Zimmermann.*

**Reese, A. B. Intrascleral nerve loops.** Arch. of Ophth., 1931, v. 6, Nov., pp. 698-703.

The long ciliary nerves accompany the long posterior ciliary arteries. Each nerve bifurcates before reaching the suprachoroidal space. In some cases, one or more of these nerves, near the juncture of the orbicularis ciliaris and the corona ciliaris, about 2.5 to 3 mm. from the angle of the anterior chamber, enter the sclera and then turn abruptly back again to pursue their forward course. Opinion is divided as to whether these loops represent a normal or abnormal growth. That they are the latter is suggested by the neuroma-like enlargement of about sixty-five percent, the report of a neuroma arising in all probability from one such growth, an accompanying coloboma of the iris in one instance, and the occasional appearance of similar abnormal growths in the optic nerve and chiasm. *M. H. Post.*

**Samojloff, A. J. Experimental and clinical studies on tuberculin reactions in tuberculous keratitis.** Klin. M. f. Augenh., 1931, v. 87, Aug., p. 215.

Subcutaneous tuberculin injections produced such clear focal reactions in the eyes of rabbits affected with experimental tuberculous keratitis, that sixteen patients with diffuse interstitial keratitis were subjected to subcutaneous tuberculin tests. The occurrence of biomicroscopically visible focal reactions in the eyes not only confirmed the tuberculous etiology of the keratitis but also gave special evidence of the general immunobiological condition of the organism, which is very important for the therapeutic use of tuberculin. Tuberculin injections proved to be a simple and practical procedure to evoke some interesting phenomena in the corneal focus and in other ocular tissues. Certain peculiarities of the clinical course of tuberculous keratitis could be observed, which so far have been insufficiently considered.

*C. Zimmermann.*

**Sitchevska, Olga. An unusual corneal opacity.** Arch. of Ophth., 1931, v. 6, Sept., pp. 398-403.

One eye only was affected. There was no change in the surface and luster of the cornea, but there were "numerous fine, round, greyish opacities . . . deeply situated and diffusely spread over the cornea, leaving in the periphery a clear zone from 2 to 3 mm. in width." The slit-lamp showed the opacities to be located in the anterior layers of the substantia propria. The dots were greyish white, or occasionally brownish, in color. Tuberculin tests were negative. A congenital origin appears most likely because of the symmetrical and regular distribution of the granules in the cornea.

*M. H. Post.*

**Szokolik, E. Peritomy for preventing gonorrhreal corneal complications.** Klin. M. f. Augenh., 1931, v. 87, Sept., p. 408.

According to Szokolik, involvement of the cornea in gonorrhreal conjunctivitis depends on the intensity of chemosis. If slight, ulcers of the cornea may develop, if intense the whole cornea becomes opaque and may slough. A timely peritomy may stop the corneal complication, as illustrated on two cases. From this may be inferred that the affection of the cornea is caused by pressure and disturbance of nutrition of the marginal vascular loops. Peritomy was well tolerated in the author's cases. If in spite of it a new ulcer forms, this may be arrested by repeated puncture of the anterior chamber.

*C. Zimmermann.*

**Vannas, M. A case of white fatty dystrophy of the periphery of the cornea.** Klin. M. f. Augenh., 1931, v. 87, Sept., p. 289. (Ill.)

Both corneas of a woman aged eighty-four years presented peripherally a very opaque, only partly interrupted, ring-shaped ribbon of intense white color, with numerous new-formed superficial vessels. The epithelium was attenuated and Bowman's membrane loosened or absent. Between the lamellæ of the stroma was an abundant accumulation of small and larger particles of fat, most likely from the blood.

*C. Zimmermann.*

Verderame, F. **Tattooing of the cornea with platinum chloride.** Rev. Gén. d'Opht., 1930, v. 44, June-July, pp. 209-221.

The writer reports four cases of successful tattooing of corneal leucoma with platinum chloride. He considers the method ideal in that it permits one to obtain a uniform and perfectly black stain. The procedure is remarkably simple and the result sure if one observes the technique carefully. His experience confirms the reports that no serious irritation follows if one uses a solution of platinum chloride not stronger than three percent. The operation is applicable to both simple and adherent leucomas. In three cases observed over periods of 9, 15 and 18 months no appreciable change in the stained areas was noted, but on the contrary they remained black, homogeneous and well delimited. No trace of vascularization occurred.

J. B. Thomas.

#### 7. UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Busacca, A. **Changes observed with the slit-lamp in the anterior segment of the globe during iridocyclitis.** Rev. Gén. d'Opht., 1930, v. 44, March-April, pp. 93-108 and 133-148.

The writer bases his report on 25 cases in which he was able to establish the clinical history minutely and to follow the course of the illness from the beginning to the cure or beyond. Edema, folds in Descemet's membrane, and obscure stripes or net-like figures of the corneal parenchyma were noted. He describes carefully the gradual formation and disappearance of deposits on the posterior surface of the cornea, several types of iritic adhesion, and modifications of the anterior surface of the crystalline lens. The anterior part of the vitreous always participates in inflammations of the anterior segment of the uvea, which are first evidenced by the appearance of granules of exudate between the fibrils of the vitreous. In certain cases there is a more or less complete destruction of the vitreous mesh with resulting yellow or white

corpuscles of exudate. This gives the vitreous an opalescent appearance. As the condition improves the dusty appearance of the vitreous disappears first, the yellow corpuscles next, while the white corpuscles persist longest and perhaps may never be completely absorbed.

J. B. Thomas.

Butler, T. H. **Coloboma lentis with abnormal ciliary body.** Brit. Jour. Ophth., 1931, v. 15, Nov., p. 648. (See Section 10, Retina and vitreous.)

Donath, Julius. **The question of voluntary mydriasis.** Klin. M. f. Augenh., 1931, v. 87, Oct., p. 509.

A woman aged twenty-six years, of poor nutrition and with hystero-epileptic symptoms, complained of occasional mydriasis. At first both pupils were dilated, later now one and now the other, with simultaneous inability to read. The different paralyses disappeared after two hypnotic sittings in eight days.

C. Zimmermann.

Fradkine, Jacques. **Cure of a case of scrofulous iritis by splenotherapy.** Bull. Soc. Franç. d'Opht., 1930, p. 241.

Fradkine reports the case of a young man having an iritis, type Poncelet, in the right eye and a nodular exudative iritis in the left, onset in the latter being some two months after the right. The patient had a personal and family history of tuberculosis. Treatment by usual means resulted in satisfactory healing of the right eye but failed to produce improvement in the left, in which vision dropped to light perception. General treatment with spleen extract was then started and resulted in rather rapid improvement leading to final cure with vision of 0.7.

Phillips Thygeson.

Fralick, F. B. **Posttraumatic tuberculous uveitis.** Arch. of Ophth., 1931, v. 6, Sept., pp. 420-425.

As a result of trauma, tuberculous uveitis may develop in the healthy appearing eye of an apparently healthy individual. A latent lesion may be aroused into activity and become localized at the site of the injury, or a quies-

cent local lesion may be stimulated into activity. A case is reported.

*M. H. Post.*

Hommel, August. **Nodular iritis in diabetes insipidus.** Klin. M. f. Augenh., 1931, v. 87, Oct., p. 492.

A man aged twenty-two years, who had been suffering from rare epileptic attacks and diabetes insipidus, presented in both eyes, without detectable infectious cause, iridocyclitis with nodules in the iris, deposits on Descemet's membrane and opacities of the vitreous. With improvement of his general condition the nodules disappeared entirely without leaving scars. This, apart from the appearance of the lesions, spoke against tuberculosis. The Wassermann was negative. Roentgen rays revealed no changes of the skull, especially not of the sella turcica.

*C. Zimmermann.*

Lundsgaard, K. K. K. **Uveitis occurring in a case of Malta fever.** Oftal. Selskab i København's Forhandlinger, 1930-1931. In Hospitalstidende, 1931, July 30.

Uveitis and disseminated choroiditis occurred in a male patient twenty-five years old, who was ill with an undoubted Malta fever. The writer has seen this complication with Malta fever once before (Acta Ophth., 1928).

*D. L. Tilderquist.*

Onfray, R., Plicque, J., and Duclos. **Chronic iridocyclitis and tuberculosis.** Bull. Soc. Franc. d'Ophth., 1930, p. 229.

Nine cases of iridocyclitis, believed tuberculous, are reported. In the first case an anatomical diagnosis of tuberculosis was made, while in the others the diagnosis was made simply on clinical grounds. The cases grouped themselves under the three following types: nodular iritis, serous iritis, and plastic iritis. In eight out of the nine cases definite improvement was obtained by the use of the methylated antigen of Boquet and Nègre. This was used according to the technique prescribed by the Pasteur Institute: biweekly injections of dilute antigen increased gradually in

strength. No general or local reactions were noted. In nodular iritis there was one complete failure and one relative success, but in plastic iritis and above all in serous iritis the action of the antigen was distinctly favorable. In several of the cases surgical action was required for relief of hypertension but this was accomplished without complication.

The authors conclude that in every case of iridocyclitis of either plastic or serous form, with slow evolution, resisting mercury and arsenic therapy, one should apply the methylated tuberculous antigen treatment. In the cases in which hypertension develops during evolution one is justified in using surgical procedures: preferably corneoscleral fistulization for the serous and iridectomy for the plastic type.

*Phillips Thygeson.*

Parker, W. R., and Fralick, F. B. **Choroideremia.** Arch. of Ophth., 1931, v. 6, Aug., pp. 213-220.

Including the author's case, thirteen cases in all of this condition have been reported. It is a bilateral developmental abnormality in which the entire choroid, except a small area in the macula, is absent. There is always contraction of the visual fields, though the central vision may be normal. The condition appears, but has not been proved, to be developmental, from absence of the short ciliary arteries. The patients have all been males between the ages of sixteen and forty-four years. The vision appears not to change throughout life, nor is there any history of illness or injury. Consanguinity appears to play no part. In three cases there was a probable familial tendency.

*M. H. Post.*

Petrovié, A., and Tschemolossow, A. **Voluntary mydriasis.** Klin. M. f. Augenh., 1931, v. 87, Aug., p. 230.

An oculist aged sixty-two years had for years been able to dilate his pupils voluntarily by imagining something horrible. His health had always been good, but in the last few years he had developed some neurasthenic symptoms. The authors observed and de-

scribed one such experiment, lasting thirty seconds, in which the patient gradually dilated his pupils from 3 mm. to 4.5 mm., with simultaneous increased frequency of the pulse from 60 to 72 per minute. The mydriasis was produced by excitation of the sympathetic nerve acting on the dilatator pupillæ.

C. Zimmermann.

Redslob, E. **Histologic researches on the dilator of the pupil.** Bull. Soc. Franç. d'Opht., 1930, p. 206.

Redslob has studied histologically the development of the dilator muscle of the pupil in the chick embryo. He states that this muscle, at least in the portion which corresponds to the dilator muscle of mammals, is made up of fibers of variable striation which are placed radially in contact with the anterior neuroepithelial layer of the iris. The muscle is entirely of mesodermal origin. It develops outside the epithelium, from which it is separated by a well marked limiting membrane. The anterior epithelial layer is incapable of elaborating these muscular elements, since it early degenerates over almost its entire extent. The author then brings up the question whether or not there is any essential difference between this definitely mesodermal muscle of the chick and the dilator muscular layer of mammals, which according to present ideas is of neuroepithelial origin. For the chick iris the theory of Grynfeltt, Herford, Szily, Zietschmann, and others is certainly not applicable. Phillips Thygeson.

Samoilov, A. I. **The significance of focal reactions in the diagnosis and the specific therapy of tuberculous choroiditis.** Russkii Opht. Jour., 1931, v. 13, May-June, p. 480.

In the author's experience, choroidal lesions constitute about twenty percent of ocular tuberculosis. In the diagnosis of choroidal tuberculosis, the focal reaction is of deciding value. This reaction should be provoked with extreme caution in order to avoid severe intraocular hemorrhages. Samoilov has found that the earliest response to tuberculin takes place in the form of a

migration of pigment in the affected choroidal area. This is probably due to a more active lymph circulation in the tuberculous focus following injection of tuberculin. The migration of choroidal pigment is an earlier and more harmless manifestation than the subsequent vascular reaction in the form of active hyperemia and extravasation. It can be often accomplished through injection of the initial diagnostic dose of —0.2 c. c. of a 1 to 10,000,000 solution of tuberculin.

The tuberculin therapy of choroidal lesions must be controlled by constant ophthalmoscopic observation, and the dose should be lowered whenever a distinct reaction is noticed in the fundus picture. Both in the diagnosis and in the specific therapy of tuberculous choroiditis, the focal reaction is of greater value than the systemic one.

M. Beigelman.

Sédan, Jean. **Recurrent iritis in a hemophiliac.** Bull. Soc. Franç. d'Opht., 1930, p. 222.

Sédan reports the case of a young Jewish boy, affected with true familial hemophilia, who was subject to recurrent attacks of severe iritis occurring simultaneously with or shortly after the hemorrhages of the former disease. The iritis was usually bilateral, with intense miosis, deposits of fibrin in the anterior chamber, hypotony, and violent circumcorneal injection. When antidiphtheric serum was used in treatment of the general disease healing of the iritis occurred rapidly, but with local measures alone healing was very much delayed. Prolonged observation and elimination of other possible causes of the iritis lead the author to incriminate the hemophilic syndrome as the etiologic agent in the eye condition. He suggests that the iritis may arise from toxic phenomena due to absorption of blood.

Phillips Thygeson.

Werkle, Fritz. **Progressive atrophy of the choroid with pigmentary degeneration of the retina.** Klin. M. f. Augenh., 1931, v. 87, Aug., p. 173. (See Section 10, Retina and vitreous.)

#### 8. GLAUCOMA AND OCULAR TENSION

Ascher, K. W. **The mechanism of ocular hypotension by erythrophlein.** Klin. M. f. Augenh., 1931, v. 87, Aug., p. 160. (III.)

Ascher attributes the lowering of intraocular tension after instillation or subconjunctival injection of erythrophlein to inhibition by cornea and sclera of water from the interior of the eye. He proved this by exact measurement of volume and weight before and after the application of erythrophlein in different animals, and histologically by the enormous thickening of the cornea. While under erythrophlein treatment the weight of cornea, sclera, and lens increases, whereas the whole eye shows no or smaller increase of weight, sometimes even a decrease. Hence the total mass of the eyeball must have decreased. If the unopened treated and untreated eyes are left to dry for days, the percentual loss of water by the whole eye is approximately equal on both sides. Thus under erythrophlein the water content of the whole eye is almost unchanged, although that of capsule and lens has become greater. These facts demonstrate that hypotension from erythrophlein goes with diminution of the ocular contents in spite of swelling of the covering tunics.

C. Zimmermann.

Byers, W. G. M. **Buphthalmos secondary to congenital iridocyclitis.** Arch. of Ophth., 1931, v. 6, Oct., pp. 578-581.

The case reported in this brief paper is unique in the literature. At birth the eye was blind, the pupil white, and the globe somewhat enlarged. Because of pain and tenderness, the eye was removed and sent to the author for examination. The changes noted were typical, in the opinion of the author, of chronic untreated iritis, wherefore the diagnosis of buphthalmos secondary to congenital iritis was made.

M. H. Post.

Courtney, R. H., and Hill, Emory. **Hereditary juvenile glaucoma simplex.**

Jour. Amer. Med. Assoc., 1931, v. 97, Nov. 28, p. 1602.

A report is made of a family in which this condition has been present for five generations. Case histories and the genealogical tree are given. The literature and some of the previously reported families are reviewed. It seems clear, both from a review of the literature and from a study of the family now reported, that there is a definite type of glaucoma which is hereditary. It occurs usually in the second or third decade of life and is not accompanied by the recognized conditions occurring in glaucoma of later life; i.e., small cornea, shallow anterior chamber, ametropia, and large lens; nor is it associated with other congenital defects, such as aniridia and coloboma.

It is probable that the glaucoma factor is dominant over the factor for normal eyes, and follows the same hereditary laws as brown irides. While the hereditary type of juvenile glaucoma logically falls into the classification of chronic glaucoma to distinguish it from the acute congestive type, it must be recognized that the disease in reality runs a rather rapid course, and that early diagnosis and early surgical intervention are essential. There is no evidence that the disease can be influenced by miotics or other hypotensive drugs.

(Discussion.) George H. Stine.

Ferree, C. E., and Rand, G. **A checking standard for tonometers.** Arch. of Ophth., 1931, v. 6, Nov., pp. 689-697.

In order to standardize tonometry, it is necessary that a few points be clarified. We must have (1) a clearer conception of what is measured in tonometry, (2) one type of instrument, (3) a knowledge of the variable factors present, (4) devices and methods of minimizing these factors, (5) better care of tonometers, (6) a checking standard for determining the accuracy of an instrument at all times, and (7) the determination of the distribution curves of a carefully selected instrument, the readings of which may be compared with other instruments requiring recalibration.

It would be an improvement on the present instrument if the pressure applied for indentation of the cornea were expressed in "terms of dynes per square centimeter or square millimeter, or in units of the centimeter-gram-second system, and to measure the indentation directly in terms of millimeters." Schiøtz' plan of translating the scale readings into intraocular pressures is most confusing. The present device is limited to comparison of the readings of the same instrument at various times, or of one instrument with another, possibly a standard. After this statement of the problem, the balance of the paper describes in detail the rather complicated apparatus constructed for this purpose.

M. H. Post.

Gjessing, H. G. A. Holth's iridencleisis antiglaucomatosa. Arch. of Ophth., 1931, v. 6, Oct., pp. 489-509.

The author performed iridencleisis antiglaucomatosa, according to Holth's technique, in 152 cases of chronic glaucoma, between August, 1911, and February, 1931. One hundred and twenty-two of them have been followed for from six months to thirteen years. In twenty cases, total iridectomy, with subconjunctival inclusion of one or both iris pillars, was performed. In three cases, iridencleisis was done after other methods had failed. The bent-stop keratome of Holth was used in all cases. This technique appears to the author most important. Meridional iridotomy seems the best method for reducing the tension, as none of the fistula-forming material is lost, the pupil is only slightly dislocated, and dazzling is avoided. In only three cases were the results bad, and in twenty-two cases, though termed unsuccessful, the eventual outcome was delayed. The author feels that a retrobulbar injection, according to the method of Duverger, greatly reduces the chances of hemorrhage during the opening of the anterior chamber, and that slight massage of the wound the fifth day following operation is of benefit in preventing later closure of the fistula.

This operation does not offer better

permanent results than other operations for glaucoma, and, as in other operations for glaucoma, the best results are obtained when it is performed early in the course of the disease.

M. H. Post.

Hofe, K. vom, and Hartung, H. Further experiments on hypotony following hypertony. Klin. M. f. Augenh., 1931, v. 87, Oct., p. 486. (Ill.)

Injection of 0.05 c.c. of physiological salt solution into the vitreous of rabbits produces after temporary increase of tension a distinct decrease of shorter or longer duration. If the injection needle is slowly and briefly introduced into the vitreous the ocular tension, within the sources of error of this method, remains constant. Luxation of the eye of longer duration acts similarly to an injection of physiological salt solution into the vitreous. Histological examination of eyes enucleated five or more days after injection exhibited, in accordance with the findings of Poos, inflammatory changes of the anterior and posterior segments.

C. Zimmermann.

Jasinski, M. Comparative study of the osmotic pressure of the aqueous humor and of the blood serum in normal and glaucomatous persons. Bull. Soc. Franç. d'Oph., 1930, p. 251.

Jasinski studied the osmotic pressure of the aqueous and of the blood serum in a large series of glaucomatous and normal persons. The method used was the author's modification of the micro-method of Barger. From the results obtained he concludes that the osmotic pressure of the aqueous in normal and also in trachomatous cases is higher than that of the blood serum. There is no difference in the ratio between the osmotic pressures of the aqueous and of the blood serum in normal and in trachomatous persons. The osmotic pressure of the blood and of the aqueous is higher than that of the subretinal fluid in cases of retinal detachment. For these experiments it is perfectly justifiable to use the aqueous humor of nor-

mal persons, since the minor surgical intervention involved is absolutely without danger. *Phillips Thygeson.*

Kunz, Eberhard. **Abnormal size of the lens as cause of juvenile glaucoma.** Klin. M. f. Augenh., 1931, v. 87, Oct., p. 433.

A hitherto healthy man aged eighteen years had consulted a physician a few months ago on account of failing vision and had been given spectacles. As these did not help him he came to the clinic. He counted fingers at one meter. Both eyes were glaucomatous, tension 45 and 47 mm., anterior chamber shallow, the ocular diaphragm especially in the pupillary area protruding. There was deep, but not marginal, excavation of the disc. The measurements, given in detail, showed a small anterior and a very much stretched posterior segment, with a very much enlarged lens. After pilocarpin the tension increased, with intense pain, so that iridectomy was performed on both eyes. A month later tension rose again but fell after pilocarpin, apparently because the communication between anterior and posterior chambers had been freed by the iridectomy. It was also probable that the circumtentorial space was very narrow, which prevented sufficient efflux from the vitreous. The myopia surely was due to elongation of the axis of the lens (probably 5 mm. according to the measurements).

*C. Zimmermann.*

Magitot, A. **The aqueous humor in glaucoma.** Arch. of Ophth., 1931, v. 6, Nov., pp. 647-662.

The author asks that the belief that the aqueous humor is simply blood serum modified by certain thermodynamic forces be accepted, at least tentatively, and that the aqueous be considered as not necessarily formed from a single source. It should be looked upon as belonging to a group with several other body fluids. In no instance can the fluid found be derived except as a dialyzate of the capillary network.

Blood pressure plays a large part in the hypertension of glaucoma. Sclerosis

of all the vessel walls and a certain hypertrophy of the arterial walls are usually to be made out. The pressure in the capillaries, especially, is increased. In the macula it remains high even after operation. In glaucoma, the initial lesion lies in the capillaries, resulting in an increase in the permeability of their walls and also in the blood pressure. Behind these phenomena lie toxic, infectious, and especially nervous disorders.

The endocrine factor is little understood, the hydrodynamic best. Various studies have shown that where there is increase or decrease in the systolic pressure, there is always an elevation of the local blood pressure. This results from a hindrance in the venous circulation and diminution in the caliber of the capillaries. A third factor may well be found in the nervous system, possibly a disease in the vagosympathetic system itself, and indeed, an imbalance in the internal secretions possibly plays a part.

*M. H. Post.*

Magitot, A. **Normal and pathologic hypertensive reactions after compression of the globe.** Ann. d'Ocul., 1931, v. 168, Oct., pp. 785-807.

After applying a weight to the normal eye the ocular tension falls to zero to rise again to a first, second, and sometimes third hypertension. Usually the maximum is slightly above the normal in the human. The curves obtained over a period of time correspond to those following puncture of the anterior chamber. This drop in tension and the subsequent reactions are determined by chemical osmotic relationships, hydro-mechanics, and nervous influences.

The author distinguishes three types of glaucoma response: (1) Reduction of tension by the use of a weight in the presence of hypertension is almost impossible. A prompt and strong rise follows with a second, third, or even fourth phase. The return to normal is delayed. (2) In a nonhypertensive eye, reduction in tension will follow the compression but the responses are variable. The third type is found in glaucomatous eyes in which after operation the tension has become normal. An instability

of the eye is shown with changes variable, as in the second type.

In glaucoma the state of hypertension is due to edema of the ocular tissues and increased intraocular blood pressure. The vascular layer is diseased, a basic fact. The success of a glaucoma operation lies merely in relief of the edema. Following puncture of the anterior chamber of an eye with idiopathic detached retina a rapid drop in tension to zero occurs. This remains for as long as six hours. *H. Rommel Hildreth.*

**Sondermann, R. The importance of ocular tension for the healthy and diseased eye.** Klin. M. f. Augenh., 1931, v. 87, Oct., p. 450, (III.)

From his embryological investigations the author concludes that the origin of intraocular tension is dependent upon venous congestion in the choroidal system. This supports the suspicion that the intraocular tension required for the function of the eye coincidentally offers the most favorable condition for preservation of its health and healing of its diseases. A further point in favor of this view is the beneficial influence upon eye diseases of decrease of ocular tension by abolition of the anterior chamber, which produces, beside hyperemia of iris and ciliary body, acceleration of circulation in the whole eye. Increase of tension, ever so slight, considerably lessens the circulation. *C. Zimmermann.*

**Turkus-Sterlingowa, B. Hydrophthalmos and buphthalmos. A case of hydrophthalmos with hypotony and with a gelatinous mass in the anterior chamber.** Klinika Oczna, 1931, v. 9, June, p. 17.

The patient, a boy aged eleven years, had hydrophthalmos of the left eye with decreased intraocular pressure. On histopathologic examination of the enucleated eye, the following changes were found: rupture of Descemet's membrane, infiltration of the corneal parenchyma, and deep excavation of the optic disc. A gelatinous mass was revealed in the anterior chamber. This is in complete accord with the reports of Halben and Wiener. The author accepts Hip-

pel's theory of intrauterine infection in discussing the probable cause of the hydrophthalmos in the reported case.

*M. Beigelman.*

#### 9. CRYSTALLINE LENS

**Abramowitz, I. A new method of intracapsular cataract extraction.** Klinika Oczna, 1931, June, p. 11.

The method of intracapsular extraction devised by the author consists of the following steps: (1) Van Lint's akinesia, and preliminary corneal suture; canthotomy and superior rectus fixation if indicated. (2) Limbal incision, which should include one-half of the corneal circumference. (3) Iridectomy. (4) Speculum is removed; further fixation of the eyeball with fingers; while slight pressure is used upon the lower part of the cornea with Daviel's spoon, Smith's flat spoon is carefully introduced upon its posterior surface back of the lens. (5) Snellen's loop is applied to the anterior surface of the lens; the lens is extracted after rupturing the zonula through lateral movements of the loop. (6) The spoon is removed and the suture tied. There was no loss of vitreous in the twenty-two cases in which this method was used.

*M. Beigelman.*

**Bartels, M. A comparison of the results of operation for senile cataract with and without preliminary dissection of a conjunctival flap.** Zeit. f. Augenh., 1931, v. 75, Sept., p. 166.

The author agrees with Birch-Hirschfeld that this method of operating is very useful. The operation is not so elegant as a nicely performed classical extraction, but the operator need have no sleepless nights because of fear of infection. *F. Herbert Haessler.*

**Burky, E. L., and Woods, A. C. Lens extract: its preparation and clinical use.** Arch. of Ophth., 1931, v. 6, Oct., pp. 548-553.

Former papers by the same authors have described the preparation of lens extract and the purification of its crystalline fractions. In this paper, the authors review these matters and also

consider the clinical uses of the extract. The skin test for allergy is made by intradermal injection of 0.1 c.c. of a one percent solution. If the reaction is positive, weaker solutions are used. Traces of aqueous in bovine-protein-sensitive individuals may give positive reactions. Beef serum may, therefore, be used as a control. Two types of reaction are obtained. That which is delayed for twelve hours and reaches its peak after about twenty-four hours is most commonly associated with endophthalmitis phaco-anaphylactica. Seventy-five normal persons were tested without a single positive reaction. Of the sixty-four cataractous patients tested, seventeen percent showed positive reactions. In cases 1, 2 and 3 all of the lens substance was carefully removed at operation and there were no reactions. In case 4 inflammation developed two months after operation. Cases 5 and 6 were also sensitive to uveal pigment, and in one of them post-operative inflammation was successfully treated with uveal pigment. Case 7 was treated with lens extract before operation and had an uneventful post-operative course. Case 8, negative to lens extract before operation, suffered violent postoperative inflammation, but cleared after a long course of treatment with uveal pigment and lens extract. Before operation on the second eye, a protracted desensitization was carried out and an uneventful postoperative course ensued. But six months later, disturbance recurred in the first eye and again subsided under treatment with lens antigen. Case 9 developed a chronic inflammation. The cutaneous test after operation was positive, but treatment was not undertaken. Cases 10 and 11 showed positive skin reactions following operation, along with endophthalmitis phaco-anaphylactica. They cleared under lens antigen therapy.

*M. H. Post.*

Daniels, B. **Investigation of the iodin treatment of senile cataract.** Zeit. f. Augenh., 1931, v. 75, Sept., p. 129.

In fifteen patients who were to be operated upon for cataract the eye was immersed in a one percent solution of sodium iodide for ten minutes three

times daily during a varying period of one to sixteen days preceding the operation. In all eyes that had been treated for more than twenty-four hours the lens contained iodin varying in quantity between 0.045 and 0.374 percent. Demonstration of the presence of iodin in the lens is not proof however that the drug is therapeutically effective.

*F. Herbert Haessler.*

Farkas, L. **A rare triangular cloverleaf cataract with dehiscence of the anterior embryonal suture.** Klin. M. f. Augenh., 1931, v. 87, Sept., p. 350. (Ill.)

The patient suffered from convulsions soon after his premature birth at seven months. V. 15/30. His teeth were carious, devoid of enamel, and, especially the incisors, partly broken off. In the pupillary area, leaving the periphery free, a triangular clover leaf cataract lay in the central embryonal nucleus as a finely dotted opacity. The anterior embryonal suture was opaque and showed a considerable dehiscence. The author attributes the etiology to the convulsions of infantile tetany.

*C. Zimmermann.*

Friedman, Benjamin. **The development of the lens: its significance in the interpretation of lenticular abnormalities.** Arch. of Ophth., 1931, v. 6, Oct., pp. 558-577.

The first and major portion of the paper describes in a very clear and consecutive manner the development of the lens. The second part falls into three groups: (1) abnormalities due to arrest of development at a certain prenatal stage; (2) those due to rests of embryonic structure; (3) those unrelated to the embryonic cycle, but due to injury, toxins, or dystrophic influences. Under the first of these are considered aphakia, microphakia, coloboma of the lens, ectopia lentis, anterior lenticonus, anterior polar cataract and pyramidal cataract, the disc-shaped cataract, congenital zonular cataract, congenital Morgagnian cataract, and axial fusiform cataract. As abnormalities due to persistence of fetal structures are mentioned tags of persistent pupillary membrane, pigment on the surface of the

lens, posterior polar cataract, and persistence of the hyaloid artery and the canal of Cloquet. Pathologic conditions are considered in general, as, for instance, the regional development of cataract with relation to the various stages of growth of the lens and the time of onset.

M. H. Post.

Löwenstein, Arnold. **The genesis of congenital opacities of the lens.** Klin. M. f. Augenh., 1931, v. 87, Sept., p. 382. (III.)

Löwenstein reports six new cases of congenital cataract which seem to him to confirm his assumption that inflamed filaments of the pupillary membrane penetrate the capsule of the lens, in which they produce disturbances of development. These appear as congenital cataract, capsular spot, subcapsular shield, mostly spindle-shaped cataract, or formations similar to zonular cataract. They form pigment within the capsule, generally at the apex of the spindle, in the shape of a filament. By inflammatory adhesion the involution of the pupillary membrane in many cases is prevented. Even in the adult threads of pupillary membrane may disappear. Typical club-shaped posterior synechiae in young persons may be converted into star-shaped so-called congenital pigment of the lens capsule. Hence star-shaped pigment needles are to be interpreted as uveitic products.

C. Zimmermann.

Mamoli, L. **Postoperative iridocyclitis, probably luetic.** Saggi di Oftalmologia, 1929, v. 5, p. 228.

Five cases of postoperative iridocyclitis occurring five to eight days after cataract extraction, one precociously, are reported by the author. There were no local signs at the site of the corneal section to account for the iridocyclitis. The blood Wassermann was negative, but three showed mildly positive Hecht reactions. All were treated with salicylarsenate of mercury or calomel intramuscularly. All were very greatly improved or cured.

The rapidity of action of the treatment was too specific and immediate to

allow for the consideration of a purely resolvent action of the chemicals used. Nonspecific protein therapy and local treatment brought about no improvement. The author feels that the time interval for the appearance of such luetic processes can be greatly shortened by the considerable trauma incidental to a cataract extraction.

F. M. Crage.

Székely, J. **Formation of lens substance at abnormal location without visible disintegration in the aqueous.** Klin. M. f. Augenh., 1931, v. 87, Sept., p. 313. (III.)

Anatomical examination of three eyeballs showed that, aside from new formation of lens substance in secondary cataracts as observed by Elschnig, there also occurs the same new formation after injury or rupture of the capsule. This new-formed lens substance, called "deformed lens fibers", may develop near the posterior equatorial zone through proliferation of epithelium from the equator, or from epithelial cells on the anterior surface of the lens, under the influence of the aqueous, to which it becomes accustomed so as to show no disintegration. It occurs chiefly in older persons with sclerosis or cataract, and represents a kind of regeneration of lens substance, which protects the lens fibers behind it from further destruction and swelling.

Vormann. **Wandering lens which resulted from congenital lenticular ectopia.** Zeit. f. Augenh., 1931, v. 75, Sept., p. 160.

In a patient with congenital ectopia lentis, further degenerative changes made it possible for the lens to be brought through the pupil into the anterior chamber by violent head movements. Increased tension and iridocyclitis were never observed.

F. Herbert Haessler.

Weinstein, Paul. **The question of physicochemical mechanism of origin of cataracts.** Klin. M. f. Augenh., 1931, v. 87, Sept., p. 397.

Jess and others found that with advancing age the cystein of the lens diminished, with secondarily decreasing

oxidative capacity. The cystein reaction (nitroprusside of sodium), described in detail, was negative in hypermature cataracts, partly positive in advancing cataracts. Weinstein tested with it thirty-five lenses: one tetanic, one zonular, two posterior cortical, four Morgagnian, and twenty-seven extracted within the capsule. In the Morgagnian cataract the test was negative. Aside from two hypermature, all cataracts extracted within the capsule gave positive reactions, most characteristic in hypermature cataracts, where the change of color occurred on the capsule, not the lens. In another group of cataracts the reaction was positive in the grey part, as in traumatic and toxic (naphthalin) cataracts. Weinstein assumes that from the genetic point of view it is of primary importance that in senile cataract the reaction is negative (not considering the capsule) in contrast with traumatic and toxic cataracts.

C. Zimmermann.

**Wilczek, M. Lenticonus posterior.**  
Klinika Oczna, 1931, June, p. 1.

The patient, a young man aged twenty years, had visual acuity of 6/60 with his right eye. On illuminating with a retinoscope the dilated pupil of this eye, the phenomenon of "a drop of oil" was noticed at the posterior pole of the lens. The retinoscopic refraction in this particular area was -14.0 D, while at the periphery of the pupil the refraction was +3.0 D. With the slit-lamp the posterior pole of the lens was found projecting deeply into the vitreous. There was also a posterior polar cataract. A detailed review of the previously reported posterior lenticonus cases is appended.

M. Beigelman.

#### 10. RETINA AND VITREOUS

**Berliner, M. L. Cytologic studies on the retina: 1. Normal coexistence of oligodendroglia and myelinated nerve fibers.** Arch. of Ophth., 1931, v. 6, Nov., pp. 740-751.

In a former paper the author stated his belief that medullated nerve fibers were the result of the abnormal presence of oligodendroglia in the retina. In

the rabbit eye the lamina cribrosa is missing and medullated nerve fibers are always present, especially laterally from the disc. In the same localities are also found the oligodendroglial nuclei, arranged about as they appear in the optic nerve. Where myelin sheaths are lacking, on the other hand, so also are the oligodendroglia. These cells are demonstrated by the silver carbonate method of Rio Hortega, interesting drawings of which accompany the paper. The author includes a detailed description of the staining procedure. It would appear from these specimens that the oligodendroglia either directly secrete myelin, or else play an important part in its development. When these sheaths are absent only Mueller's fiber cells, astrocytes, and microglia are found. It seems likely that where oligodendroglia and myelin sheaths are present in the human retina some defect or retardation in development has occurred in the lamina cribrosa.

By the silver carbonate method of staining, the author has also shown that the limiting membrane of the retina is a close meshwork formed by fine branching processes of Mueller's cells and astrocytes.

M. H. Post.

**Burk, Arnold. On the histology of arteria hyaloidea persistens.** Zeit. f. Augenh., 1931, v. 75, Sept., p. 168.

From the center of the disc arose a tent-like mass of spindle-cell glial tissue which extended to the posterior lental surface. In its interior was an endothelial tube filled with red blood corpuscles. Associated with this anomaly was a developmental anomaly of the lens, the epithelium of which was replaced by tissue consisting of several layers of spindle-shaped cells with spindle-shaped and rarely epithelioid nuclei.

F. Herbert Haessler.

**Butler, T. H. Coloboma lentis with abnormal ciliary body.** Brit. Jour. Ophth., 1931, v. 15, Nov., p. 648.

A female aged twenty-three years, vision right eye 6/12, presented close behind the crystalline lens a smooth grey circumscribed mass suggesting a

sarcoma of the ciliary body. Local examination with a loupe revealed a brown mass, sponge-like in texture, with no trace of irregularity or vascularization. With dilated pupil a small coloboma of the lens was discovered. There appeared to be a small opacity in the lower part of the lens. With a slit-lamp the mass appeared as ordinary uveal tissue, probably a fusion of several processes. The vitreous was clear, the tension normal. *D. F. Harbridge.*

Horine, E. F., and Weiss, M. M. **Retinal changes of arteriosclerotic heart disease and essential hypertension.** Arch. of Ophth., 1931, v. 6, Oct., pp. 535-543.

Much confusion exists in the use of such terms as cardiorenal disease, essential hypertension, benign hypertension, arteriosclerosis, and arteriosclerotic heart disease. The authors confine themselves to that type of hypertensive cardiovascular disease in which no known etiological factor can be determined, except hereditary predisposition. Such hypertension is a disease of the arterioles and is characterized by "hypertrophy of the intima, with gradual obliteration of the lumen, and hypertrophy of the muscular layer of the media, with replacement hypertrophy". These changes, which are entirely independent of the condition of the large vessels, maintain the elevation of the blood pressure. In addition to the usual signs of sclerosis of the vessels, the disc is red and swollen, and in many cases there is generalized edema of the retina. Scattered hemorrhages and "cotton wool" areas are seen. "Very often these white spots assume a stellate arrangement around the macula." The author suggests the term "arteriolar sclerotic retinitis" for the retinal condition accompanying essential hypertensive heart disease.

*M. H. Post.*

Knapp, Paul. **Rare complication of detachment of the retina cauterized by Gonin's method.** Klin. M. f. Augenh., 1931, v. 87, Sept., p. 399.

A woman, who was struck in the eye by her child, showed detachment of the

whole lower half of the retina, which was torn from the ora serrata with a gaping rent from six to eight disc diameters long. By cauterization of the upper edge, then the lower, and finally the tear itself the retina was reattached, but papillitis developed. Vision was from 0.5 to 0.7, tension 15 mm. Hg. After two months the patient returned with a slight visual disturbance which she had noticed while hanging up clothes. Toward the temporal side of the disc a large hemorrhage and at the lower periphery a slight detachment without visible rupture were discovered. Under rest in bed and subconjunctival injections of sodium chloride the hemorrhage subsided and the swelling of the disc slowly decreased. The detachment increased during a severe bronchitis probably due to a certain tension in the cicatrized retina. Gradually white retinitic streaks developed with slow reattachment excepting a small part at the periphery. Vision 0.7. Perhaps these streaks originated from coagulations of fibrin in the subretinal fluid which glued the retina to the choroid, a favorable mode of natural healing.

*C. Zimmermann.*

Kraupa, E. **The "vitreous dot" (Litinsky).** Klin. M. f. Augenh., 1931, v. 87, Oct., p. 511.

The round symmetrical formation in the vitreous described by Litinsky in the same journal, volume 87, page 205, is a typical, not especially rare, condition. On movements of the eye it fluctuates in the vitreous to return to its old position, being held by minute threads. Kraupa saw it mostly in myopias of from 6 to 8 D., myopias with congenital retinal anomalies, and retinitis pigmentosa. *C. Zimmermann.*

Lijo Pavia, J. **Alterations in the foveal reflexes as a sign of small lesions in that area.** Rev. Oto-Neuro-Oftal. etc., 1931, v. 6, June, p. 234.

Observations of the foveal reflexes by red-free light, afford considerable aid in the diagnosis of small retinal lesions that are not visible by the ordinary methods of examination. This is due to

alterations in the level of the internal limiting membrane by small amounts of edema, that change the normal concave-mirror reflexion of that area. Not only may these be readily seen, but many photographs of them accompany the article. Visual fields are also reproduced showing central effects of these small changes.

*A. G. Wilde.*

Litinsky, G. A. **A bilateral round symmetrical formation in the vitreous.** Klin. M. f. Augenh., 1931, v. 87, Aug., p. 205.

In both eyes of a farmer aged twenty-four years, affected with retinitis pigmentosa and hemeralopia, a round yellowish-grey movable new formation of the size of a pea was seen in the vitreous down to the nasal side of the disc. The slit-lamp revealed very firm threads extending from the ora serrata, embracing the lens, to the formation, so that it always returned to its original position. Perhaps it was an involution of the mesodermal vitreous of the embryonic eye.

*C. Zimmermann.*

Manés. **Ophthalmic indications for interruption of pregnancy.** Arch. de Oftal. de Buenos Aires, 1931, v. 6, June, p. 359.

The albuminuric type of retinitis, retinal foci coincident with nephritis, small retinal hemorrhages, or white spots around the disc during pregnancy constitute a double jeopardy, i.e., to both vision and life. Therapeutic abortion may be followed by rapid clearing of the retinal lesions, with recovery of vision. Where evacuation of the uterine contents has been unduly delayed, retinal lesions may spread, or may lead to detachment. When a pregnant woman has a previously detached retina in one eye, any disturbance of vision in the other, however trivial, is sufficient to demand examination into its cause, with a view to possible interruption of pregnancy. In bilateral keratoconus, pregnancy has been followed by increase of conicity, although it may not be to the same degree in each eye. Where there is a history of antecedent vitreous hemorrhages, pregnancy may cause these to recur.

*A. G. Wilde.*

Nicolletti, G. **The Gonin operation for detached retina.** Ann. di Ottal., 1931, v. 59, July, p. 636.

The present writer has done for the Italian world what others have done in other countries, in carefully reviewing the existing literature on Gonin's operation and bringing it up to date. He adds nothing of special importance, but repeats and emphasizes Gonin's words, that "the time is not far distant, let us hope, when the oculist who neglects to search for the tear in a detached retina with a view of securing its obturation will be considered as negligent as are those who make no effort to determine the tension of a glaucomatous eye or seek to restore it to normal." (Bibliography.)

*Park Lewis.*

Pavia and Dusseldorf. **Lagleyze-von Hippel disease.** Rev. Oto-Neuro-Oftal. etc., 1931, v. 6, June, p. 189.

The article presents stereoscopic photographs, diagrams, and case histories, with discussion of symptomatology and pathology.

*A. G. Wilde.*

Pesme, Paul. **A case of myopic detachment of the retina treated with success by the Gonin method.** Arch. d'Oph., 1931, v. 48, Oct., p. 691.

This is a report of one case of myopic detachment of the retina with a tear near the ora serrata, treated by puncture with the galvanocautery. Reapplication of the detachment was obtained, with a good visual result. The galvanocautery is preferred because of the lesser amount of reaction. In addition to closing the retinal tear the cautery puncture produces a flattening of the sclera at this point. This may be important in obliterating a local scleral ectasia.

*M. F. Weymann.*

Sanders-Larsen, S. **Exudative retinitis (Coats).** Oftal. Selskab i København's Forhandlinger, 1930-1931, pp. 2-5. In Hospitalstidende, 1931, July 30.

A case in which the diagnosis of this rare disease had been made is described. The right eye, which showed a cataract, was atrophic and completely blind. The vision of the left was limited to recogni-

tion of light. Through the binocular ophthalmoscope a whitish eyeground was seen with an irregular bulging surface; there was a hemorrhage from a vein near the macula, with small scattered hemorrhages throughout the vitreous. Below, a large prominent detachment of the retina presented itself. The author suspected a tuberculous basis for the disease and injected tuberculin (Panndorf TB vaccine) for diagnosis; a very sharp reaction followed with the temperature up to 104 degrees and with a later definite improvement in vision and in the appearance of the eyeground. Two weeks later, the eye was exposed to roentgen rays, one-eighth skin erythema dose every day for four days. During the next few months the patient was treated alternately with Panndorf A (tuberculin) and sanocrysin (gold). The vision improved slowly so that in six months the patient could read the 6/18 line at a distance of three meters. However, the slit lamp revealed a beginning coronary cataract. While the author believes that the roentgen treatment was mainly instrumental in causing the improvement, yet he warns that it is not without danger. He cites a list of authorities who report various degenerative processes in the eye following the use of the roentgen ray—among them the appearance of cataract.

D. L. Tilderquist.

Schoenberg, M. J. **Experiences with the Gonin operation.** Arch. of Ophth., 1931, v. 6, Nov., pp. 675-688.

This report covers experience with sixty cases of detachment operated on by the Gonin method. Among important observations reported from ophthalmologists everywhere may be noted: (1) the general condition has a bearing upon the liability to detachment; (2) in most cases the colloidal content of the vitreous has undergone profound changes; (3) a tear is present in the retina in about seventy-five percent of all cases; (4) degeneration of the retina is present over more or less extensive areas; (5) the choroid is usu-

ally also involved; (6) even the sclera is occasionally concerned.

The indications for operation are recent detachment, small number and small size of retinal tears and their location in an accessible region, and relatively normal-looking vitreous, iris, and retina. Contraindications are long duration of detachment, absence of tear, very large tear, cloudy media, degeneration of vitreous and retina, and active iridocyclitis. In localization of the tear, the landmarks to be noted are the long ciliary arteries and nerves, the venæ vorticosæ, and the insertions of the recti and oblique muscles. To these should be added the dark ring of the ora serrata and the lateral margins of the recti. With regard to the technique of the operation, the author advises against the use of cocaine, because of the clouding of the cornea. He suggests control of the position of the eye by introducing a strabismus hook under the muscle tendon, thus permitting traction so that the eye may be rotated as desired. The incision in the conjunctiva should be 3 to 4 mm. behind the site chosen for ignipuncture, and if the retinal tear lies under the muscle attachment a preliminary tenotomy should be done. It is wise to mark the site of puncture with india ink before making the incision. The cherry-red tip of the cautery should be introduced 3 to 4 mm. into the vitreous and kept there for from two to four seconds. The fundus should be examined before and after the operation. The ophthalmoscope permits one to ascertain whether the retina is reattached or not. If successful, there is seen a "dark round area, surrounded by an almost black, more or less complete, narrow ring, outside of which is seen a grayish-white zone of partly edematous and partly necrosed retina", the size of which depends upon the amount of heat per second applied to the tissues of the eyeball.

A number of rabbits' eyes were examined at various times after ignipuncture. The complications of the operation are discussed. Twelve cases are reported in some detail. M. H. Post.

## NEWS ITEMS

News items in this issue were received from Drs. W. Holbrook Lowell, Boston; G. Oram Ring, Philadelphia, and George H. Shuman, Pittsburgh. News items should reach Dr. Melville Black, 424 Metropolitan building, Denver, by the twelfth of the month.

### Deaths

Dr. Henry M. Thompson, San Francisco, aged fifty-three years, died in November, 1931.

Dr. John F. Shoemaker, St. Louis, aged sixty-three years, died November twenty-first, 1931, of cerebral hemorrhage.

Dr. Samuel Isaac Eber, Pittsburgh, Pa., aged fifty-two years, died November nineteenth, 1931, of myocarditis.

### Miscellaneous

At a meeting of the Osler Historical Society, November seventeenth, a portrait of the late Dr. Hiram Woods, Baltimore, was presented to the Medical and Chirurgical Faculty of Maryland.

A fellowship in neurology at the University of Chicago has been established by Dr. and Mrs. William H. Wilder, in memory of their son, William H. Wilder, Jr., who was drowned last summer. Mr. Paul G. Roofe has been appointed the first recipient of the fellowship.

Dr. Polak recently presented before the Academy of Sciences, Paris, an account of his research on color blindness. He disagrees that red and green constitute the principal defect in dyschromatopsia. According to Dr. Polak confusion of blue, violet, purple, and greenish blue are more common. He also asserts that the confusion of orange and yellowish green is very frequent; whereas a confusion of red and green is much less so.

Dr. Talbot, head of a commission to investigate trachoma in the French possession of Tunisia, reports that a systematic examination of school children has shown that the proportion affected at Tozeur is 97 percent; at Gaisa, 76 percent; and at Gabes, 53 percent. The affection occurs chiefly in children under three years of age, the child having contracted the disease nearly always through the infected mother. The infection begins at the preschool age. Not a single recent case was discovered in school children.

A group of American ophthalmologists plan to perform about one hundred operations for the removal of cataracts in India each day during the winter months. The work is under the direction of Dr. Henry T. Holland. The American physicians include Drs. Walter I. Lillie, Rochester, Minn.; Oscar B. Nugent, Beulah Cushman, and Louis Bothman, Chicago; Watson W. Gailey, Jr., Bloomington, Ill.; Joseph J. Hompes, Lincoln, Neb. Certain sections of northern India have a greater number of cataracts than any other section of the world. This is attributed to intense sunlight and lack of proper nourishment. It is planned to treat more than 5,000

natives. The British Government defrays the expenses.

### Societies

On November 14, 1931, in Paris, Professor deLapersonne was reelected president of the Executive Committee of the International Association for the Prevention of Blindness. The other members of the committee also were reelected.

The next meeting of the German Ophthalmological Society will be held at Leipzig, May 19 to 21, 1932, preceded in the evening of May 18 by the usual social gathering. The secretary of the society is Professor Wagmann of Heidelberg.

### Personal

Dr. Harvey J. Howard, St. Louis, has been appointed medical director to the Missouri Commission for the Blind, to replace Dr. Meyer Wiener, resigned. Dr. Wm. James was appointed assistant medical director.

Professor Hans Lauber of Vienna has accepted a call as professor of ophthalmology and director of the university eye clinic in Warsaw.

Dr. John A. Pilcher, Jr., formerly house surgeon in the eye department of Bellevue Hospital, is now a member of the staff of the Gill Memorial Eye, Ear and Throat Hospital, Roanoke, Virginia.

Dr. Ignaz Sommer will give, in Philadelphia, beginning February 15, 1932, his first intensive winter course in ophthalmology to graduates in medicine only. For further particulars address the director, Dr. George W. Mackenzie, 1724 Spruce street, Philadelphia.

Dr. George H. Shuman, Pittsburgh, Pa., was guest of the Columbus, Ohio, Society of Ophthalmology and Oto-Laryngology at its annual dinner meeting on December 7, 1931, and gave an illustrated presentation on "Controlled versus haphazard methods of applying oblique focal illumination in ocular diagnosis".

On the afternoon of December 28 Dr. Ramon Castroviejo, of Chicago, operated on four cases of cataract, after the method of Barraquer, on Dr. Stieren's service at Columbia Hospital, Wilkinsburg, Pa. In the evening, on invitation of the Pittsburgh Ophthalmological Society, Dr. Castroviejo gave an illustrated presentation of his new method of corneal transplantation.

Dr. George E. deSchweinitz of Philadelphia delivered a lecture before the American Philosophical Society on Friday, December 4, his theme being "Toxic amblyopias with special reference to methyl-alcohol". The lecture summarizing our knowledge of this very important subject, was illustrated by a number of lantern slides.